FOREWORD

The National Advisory Council on Education for Industry and Commerce decided, in September, 1963, to appoint an Advisory Committee on Agricultural Education with the following terms of reference:

"To advise on questions which may from time to time be referred to it relating to the provision of further education for agriculture at institutions other than universities."

The Advisory Committee was asked to report on:

"The present provision of, and future requirements for, full-time further education for agriculture in institutions other than universities with special reference to courses above the level of one year certificate courses."

This report, accordingly, does not deal with all agricultural education outside universities. In particular, it refers to part-time courses and one year certificate courses only to the extent that they impinge on the main theme. The one year certificate courses are those in agriculture, horticulture and poultry husbandry which are offered at county agricultural and horticultural institutes and admit students usually at the ages of 17 or 18.

We were informed that the terms of reference were intended to include provision for horticultural education in the institutions concerned. Our report deals with this and with education for various specialised branches of agriculture. We found in the course of our deliberations that the educational problems were similar throughout all branches of crop production and animal husbandry and we have arrived at conclusions which are for the most part of general application in these spheres. The recommendations in our report, when unqualified, are intended to refer to agriculture and agricultural education in the widest sense. Chapter 5 deals with some special issues in particular branches of agricultural education, but the remainder of the report is applicable to these as well as to education for general agriculture. For brevity in the general passages the term farm has been used to include horticultural and other specialist holding, and farmer to include grower and other specialist producer. The senses in which various other terms have been used in the report are set out in paragraph 28 and in the Glossary.

While the full Committee has met on only four occasions, the main work of sifting the evidence and drafting the report has been undertaken by a Sub-Committee whose names are shown separately at the front of the report. This Sub-Committee sat first under the Chairmanship of the late Alderman Lampard-Vachell and then of Mr. Martin Wilson; it met on nineteen occasions, thirteen of them including both morning and afternoon sessions, and the main Committee is greatly indebted to its members for undertaking the heaviest part of the work.

In the course of two enquiries the Sub-Committee consulted 129 organisations. The names of the 73 organisations and individuals who submitted written evidence and the list of persons who gave oral evidence on behalf of 27 of these organisations are appended to the report. Many of these organisations are concerned with occupations which are ancillary to agriculture and a significant proportion of the students concerned find employment in them. We wish to record our thanks to all who have assisted us by presenting evidence.

Despite differences of approach it became clear, as the evidence accumulated, that most of the organisations we consulted were in broad agreement in identifying the problems which now have to be faced to enable agricultural education to become adjusted to the present and future demands of the industry and to developments in the educational system. We hope that the solutions which we have proposed will find acceptance as offering a rational and integrated pattern of courses, supported by appropriate examination arrangements.

We wish to record the great debt that we owe to the Staff of the Department and of the Ministry of Agriculture, Fisheries and Food. Members of H.M. Inspectorate have devoted much thought to the future development of courses, and a number of officers, in addition to the main assessors, have been most helpful in supplying information and attending Sub-Committee meetings on particular subjects.

While paying a general tribute, we must particularly mention our Secretary, Mr. R. J. Baker, who has carried a heavy load most willingly. His responsibilities have been extensive throughout, and have included the translation of the earlier discussions of the Sub-Committee into a complete first draft of the Report, and latterly to a redraft of it to take account of a number of changes made by the full Committee. He has never spared himself, and the quality of his work has been outstanding.

SUMMARY AND MAIN RECOMMENDATIONS

Introduction

1. The technological revolution which has taken place in agriculture in the past 25 years, current developments in its business organisation and marketing arrangements, and the requirements of ancillary occupations, all emphasise the need for a progressive system of agricultural education, accompanied by practical (industrial) training and integrated with the rest of further education (paragraphs 1, 2, 5).

The Occupations Served

2. The structure of agriculture, with many small labour units in which farmers and workers undertake a wide range of operations, requires that the initial provision for most students should continue to be broad courses in general agriculture appropriate to their needs (paragraph 14).

3. The trend towards specialisation, however, requires a greater variety of courses, which may include general courses with options directed towards particular branches of husbandry, and supplementary, post-diploma and other courses dealing with specialised branches of production. Courses for "technicians" in these enterprises are likely to be increasingly needed (paragraphs 16–17).

4. Adequate attention should be paid to the business aspects of farming in a practical context in the treatment of all subjects of the curriculum, and in a manner appropriate to the age and ability of the student (paragraph 18).

5. Short re-orientation and refresher courses should be more widely available to mature persons (paragraph 19).

6. Diploma holders, employed in a wide variety of occupations ancillary to agricultural production, need farming experience, a variety of specialised courses and a knowledge of commercial aspects of their subjects (paragraphs 20–26).

Numerical Demand

7. About one-quarter of the young men who enter and stay in agriculture at present receive some form of day-time education. Manpower in the industry is expected to decline substantially but we would expect a higher proportion to receive technical education with the result that the number of students in full-time courses will be maintained. In particular provision will be necessary for "technicians", for mature persons who are already exercising managerial responsibility, and for other adults (paragraphs 32–36).

8. Employers in ancillary occupations have forecast a need for recruitment on the same scale as hitherto or on a somewhat larger scale. There is a firm demand for those who have attended the more specialised courses (paragraphs 37–39).

Education and Training

9. Further education is the responsibility of education authorities and practical (industrial) training is the responsibility of industry, but they are complementary aspects of a single process and should be planned and supervised as a whole (paragraph 43). The establishment of an Industrial Training Board will open up the prospect of greatly improved facilities for industrial training (paragraph 48).

10. There are various ways in which education and training may be combined more effectively than has hitherto been done (paragraph 49).

11. Sandwich courses offer one of the most promising means of integrating education and training once the initial difficulties are overcome, as is shown by recent efforts in this direction. We recommend that new courses requiring two or more years' attendance at an educational establishment should, wherever possible, be organised on a sandwich basis (paragraphs 52–54).

12. Arrangements for the practical training of students on commercial farms could also be improved by the compilation of a list of approved training farms, the provision of guidance to employers on what is required of them, the association of local education authorities and their staffs with the training arrangements, enlisting the interest of officers of the Ministry of Agriculture, Fisheries and Food in bringing educational provision to the notice of farmers and by ensuring that youth employment officers are well informed about this aspect of agricultural education (paragraph 55).

Course Organisation

13. Courses should be related to the structure and needs of the industry and the ultimate prospects of those who enter it (paragraphs 56, 57).

14. School leavers should be able to enter agricultural education at the same stages as they enter other vocational courses. This requires a range of agricultural courses leading on from various levels of general education (paragraphs 56, 58).

15. There should be avenues for progression in agricultural education similar to those found in other forms of vocational education (paragraphs 56, 65).

16. The following pattern of full-time courses above the level of the existing one-year certificate courses is recommended:

(*a*) Ordinary National Diploma type courses suitable for students with four passes at "O" level of G.C.E. or the equivalent (paragraph 67);

(*b*) Higher National Diploma type courses suitable for students with one pass at the "A" level of G.C.E. or with an Ordinary National Certificate or Ordinary National Diploma (paragraph 68);

(*c*) Degree courses suitable for students with two passes at "A" level of G.C.E. or with equivalent attainments in an Ordinary National Certificate or Ordinary National Diploma (paragraphs 69–70);

(*d*) Post diploma courses which are eminently suitable for dealing with specialist aspects of production which involve new and advanced techniques, and with farm organisation and management (paragraph 71).

17. Supplementary courses should continue as long as they are necessary (paragraph 72).

18. Following upon the adoption of the pattern of courses recommended (16 above), it would appear that there may be a need for the introduction of General ('G') courses for those who leave school without the requisite qualifications for admission to Ordinary National Diploma courses but whose school records suggest that they have the ability, with further preparation, to profit from these courses. It would also appear that Technician ('T') and Ordinary National Certificate type courses should be introduced to provide suitable part-time alternatives to the Ordinary National Diploma type courses, the Ordinary National Certificate courses serving as a route to advanced full-time courses (paragraphs 73–74).

19. A greater variety of short courses is needed (paragraph 76).

20. It would be appropriate for experimental work on husbandry problems to be undertaken in agricultural establishments which provide the more advanced courses (paragraph 78).

Special Branches and Allied Technologies

Agricultural Engineering

21. Increasing mechanisation requires that adequate attention should be paid to the subject in both general and special courses for practical farming, and that suitable provision should be made at various levels for agricultural engineers who will be employed in the manufacture, installation, distribution and repair of machinery and equipment (paragraphs 85-87).

22. An initial integrated course in agricultural engineering of an Ordinary National Diploma type deserves consideration, and appropriate qualifications should be available for all full-time courses (paragraph 88).

Dairying

23. Education for dairy farming is an appropriate part of courses in general agriculture (paragraphs 90, 97).

24. Those intending to enter the advisory services require general husbandry courses followed as necessary by post-diploma courses (paragraph 98).

25. Separate milk technology courses are required as preparation for plant operation and management and for laboratory control in the milk processing and distributing industry (paragraph 95). For these experience on a farm is desirable but not essential, whereas training in creameries is essential and could suitably form part of a sandwich course (paragraphs 99-101).

Estate Management (Rural)

26. The practice whereby the professional institutions grant exemptions from their external examinations for students who pass college examinations is welcomed (paragraph 109).

Horticulture

27. Our general recommendations on training and education, course organisation and examinations apply to horticultural education (paragraph 110).

28. The diversity of horticultural employment accentuates the problems of obtaining suitable practical experience for students and providing courses which deal adequately with specialised requirements (paragraphs 112-120).

29. There should be courses leading to a definitive qualification at about the level of the present National Diploma in Horticulture (Intermediate) examination, and students who wish to proceed to an examination at a higher level should be able to attend a full-time course (paragraph 124).

30. Horticultural courses should be organised so that students gain a broad general introduction to their subject followed by the opportunity to specialise (paragraph 125).

31. The integration of education and practical (industrial) training is particularly important in horticulture; and we would welcome the association of commercial firms, parks departments and various specialised institutions, such as botanic gardens and research, experimental and similar stations, with educational establishments in the provision of sandwich courses (paragraphs 126-127).

Poultry Husbandry

32. Courses in poultry husbandry serve an industry with highly specialised units. A full review of its needs should be undertaken by the industry and education authorities (paragraph 135).

33. It is necessary for the industry to play an effective part in providing practical training for students and we suggest that this can best be done through a joint approach by employers and education authorities, with sandwich course arrangements (paragraphs 136-139).

34. More variety is needed in poultry education through the expansion of short courses and part-time courses for those in the industry (paragraphs 140-141).

Women

35. There is a higher proportion of women in ancillary occupations, particularly those requiring the more specialised qualifications, than in agricultural production (paragraphs 142-147).

36. It is important that places in courses in all subjects, including specialised courses, should be available to women (paragraphs 148, 152, 154).

37. The distinctive contribution of agricultural education establishments to the education of farm secretaries is to help them to understand the business of the farm and the application of records and accounts to it. Initial education in the office arts and commercial subjects can be obtained elsewhere in commercial courses; and the students should receive practical training in the agricultural secretarial agencies or approved farm businesses (paragraph 152).

Examinations

38. Examination arrangements should be based on the principles that courses must fit the needs of industry and students, and examinations should fit courses; that teaching establishments should have freedom, within the context of the basic course content, to evolve their own teaching syllabuses and teaching methods; and that qualifications should have an assured national currency (paragraph 155).

39. Agricultural students enter for examinations, mostly external, which are organised by a variety of independent bodies; and the arrangements, which have grown up over the years, have a number of weaknesses (paragraphs 163-168).

40. We propose:

(*a*) the introduction of a new examination structure corresponding to the new types of course proposed;

(*b*) the provision of the opportunity for establishments to secure the external assessment of internal examinations; and

(*c*) the creation of a central body for agricultural examinations and of new award-giving boards (paragraph 170).

41. The central body should be concerned with the relationship between examinations and courses; the range of examinations; their standards and their titles; the general arrangements for assessment; relations between examination boards and teaching establishments; and the membership of examination boards (paragraph 174).

42. The central body should be a co-ordinating body and might suitably be called the Council for Agricultural Examinations (paragraph 178).

43. The Council for Agricultural Examinations should consist of members who can speak with authority from experience in industry, education and central and local government, and should be appointed by the Secretary of State for Education and Science (paragraph 180).

44. Award giving boards should be constituted under the Council to deal with awards in agriculture, horticulture, poultry husbandry, agricultural engineering and dairy technology (paragraph 183). Their constitution should be mainly representative, but they should also include other persons of knowledge and experience (paragraph 185).

The Institutional Pattern

45. The establishments which offer full-time courses in agriculture are comparatively small and no addition to their number is required (paragraph 188).

46. The diversity of courses which is required is not compatible with a rigid hierarchy of establishments (paragraph 192).

47. There is no need to restrict the use of the term " college " to a particular group of establishments in this branch of further education (paragraph 193).

48. The distribution of full-time courses should be considered nationally taking account of the suitability of the teaching farm or holding for the commercial enterprise related to the course, economy in the use of resources, and demand; and should be subject to the approval of the Secretary of State (paragraphs 195–201).

49. Agricultural education establishments should have Governing Bodies which are adequately representative of industry, and these should appoint Advisory Committees for the various departments of their establishments (paragraph 204).

INTRODUCTION

1. The technological revolution which British agriculture has undergone during the past 25 years has drawn on the resources of physics, chemistry, the biological sciences and engineering. Recently the business organisation of farming has been changing and new marketing methods are being introduced. All these developments have direct bearings on the education required by new entrants to the industry and by those already in it. The farmer of today and tomorrow needs to understand the bearings of science and technology on husbandry, the role of training in an industry that is changing, and the part that accounting and business judgements should play in the use of his resources. He requires education to this end, and it has to cover a widening range of subjects. The continued increase in productivity depends also on the training of employees, especially those in key positions, who need further education in order to understand changing and increasingly complex techniques.

2. Organisations ancillary to agricultural production, such as manufacturers and suppliers of equipment, feeding stuffs, fertilisers, and chemicals used in the industry; seed growers; bodies concerned with the marketing and distribution of agricultural products; and the research, experimental, advisory and teaching services; all these employ persons with agricultural qualifications. Their needs must also be considered in planning the educational provision.

3. Two features have distinguished the provision of agricultural education from the rest of further education. Almost all full-time courses are in comparatively small monotechnics; and until recently there was a division of central departmental responsibility, which led to there being less contact between the independent and direct grant colleges and other colleges of further education, especially with those offering part-time courses, than is usual in other branches of further education.

4. The post-war advance of agriculture has been accompanied by a doubling of the number of county agricultural institutes and by a greater concentration of the agricultural colleges on two-year diploma courses. During the period Exchequer grants to most of these colleges were increased.

5. The needs now are to secure a progressive system of agricultural courses accompanied by practical (industrial) training, and to complete the integration of agricultural education with the rest of further education(1), thereby ending the present dichotomy. These measures will meet the current and future occupational requirements of the industry, and ensure that the further development of agricultural education benefits from the provision made in other fields and, in turn, can make its contribution towards the general fund of educational facilities.

6. The planning of educational courses should be based on a clear understanding of the various types of occupation involved in the industry, which therefore need careful definition.

---

(1) The current pattern of courses in technical education is described in the White Paper "Better Opportunities in Technical Education" Cmnd. 1254, 1961. H.M.S.O. 1*s*. 9*d*.

Chapter 1. THE OCCUPATIONS SERVED

Agricultural Production

7. Three aspects of agriculture have important bearings on educational provision: geography, structure and trends.

Geographical Dispersion

8. Geographically, employment is scattered thinly over all the rural areas of the country. Part-time courses must be correspondingly widespread and assembling an adequate number of students for a particular course is an ever-present problem. Block release courses, though less localised than part-time ones, also need to be widely distributed. Full-time courses are not subject to the same limitations because the students normally have to live away from home and the courses can be organised to meet local, regional and national requirements, according to the demand.

The Structure of the Industry

9. The following persons were engaged in agriculture in England and Wales in June 1964(1):

Table 1

Persons engaged in Agriculture

Occupiers of " full-time " holdings(2) ...	...	...	... ...	160,000
Employees	Male	Female	Total	
Whole-time regular ...	309,800	23,300	333,100	
Part-time regular	35,700	24,900	60,600	
Seasonal or temporary ...	43,300	38,800	82,100	
	388,800	87,000	475,800	475,800
				635,800

" Full-time " occupiers and all employees

10. The outstanding feature of this table is the high ratio of occupiers to employees. With the correspondingly small labour units, many persons engaged in agriculture have to turn their hands to a variety of tasks over the year. By contrast, engineering has over 3½ million employees in Great Britain, 2 million of whom are in some 1,300 firms with 500 or more employees each, and the division of labour which this implies greatly facilitates the task of planning a variety of educational courses suited to the various levels and types of work. Building and construction, although having thousands of one-man firms, accounts for some 350,000 of its 1½ million employees in firms with 500 or more employees. It too has well

---

(1) Source: Ministry of Agriculture, Fisheries and Food, based on Census Return. The totals are rounded.

(2) An estimated figure. (See paragraph 12(c)(i).)

defined crafts and professional work for which a suitable range of educational courses is provided.

11. Employment in agriculture is analysed in more detail in the following table.

Table 2

Distribution of holdings and regular whole-time male workers aged 20–64,
by labour size groups(1)
June 1964

Serial	*Labour size group* (Regular whole-time male workers aged 20–64 years)	Holdings		Regular whole-time male workers (20–64 years)	
		Number	Per cent	Number	Per cent
1.	20+	562	0·6	19,633	7·9
2.	15–19	534	0·5	8,770	3·5
3.	10–14	1,705	1·7	19,649	7·9
4.	5–9	8,418	8·4	52,520	21·0
5.	4	5,519	5·5	22,076	8·8
6.	3	10,214	10·2	30,642	12·3
7.	2	23,011	22·9	46,022	18·4
8.	1	50,465	50·2	50,465	20·2
9.		100,428	100·0	249,777	100·0
10.	With regular whole-time workers other than male workers aged 20–64 years ...	21,325			
11.	With only part-time or seasonal workers	25,138			
12.	With no workers	181,913			
13.	Total holdings	328,804			

12. The following deductions, which are relevant to agricultural education, may be drawn from Table 2:

> (*a*) *Holdings with 5 or more regular whole time male workers (aged 20–64)*
>
> (i) Approximately 11,000 holdings (serials 1–4) employ 100,000 or 40 per cent of the regular whole-time adult male workers ; one half of these are on 2,800 holdings.
>
> (ii) These holdings, most of which have a substantial acreage and heavy capital investment, require the highest standard of competence in management, by farmers or managers.
>
> (iii) A labour force of 5 or more implies that there is likely to be scope for foremen or heads of individual enterprises on the farm, who will probably outnumber the managers or farmers in this group, and will require at the very minimum a sound knowledge of modern techniques of production.
>
> (iv) Many of these holdings are in the forefront of technological advance and their mature employees at all levels will need to be kept abreast of new methods.

---

(1) Source: Ministry of Agriculture, Fisheries and Food.

(*b*) *Holdings with 1–4 regular whole-time male workers (aged 20–64)*

(i) The 89,000 holdings with 1–4 regular whole-time adult male workers (serials 5–8) include many with individual enterprises on the same scale and with a similar capital investment per man as holdings in the larger labour size groups.

(ii) About two-thirds of the holdings in this group, however, have less than 150 acres, and many are comparatively small.

(*c*) *Holdings with no regular whole-time male workers (aged 20–64)*

(i) The 228,000 holdings with no regular whole-time adult male workers (serials 10–12) include many which are not truly commercial enterprises, since the census includes all holdings of land of over one acre. The Ministry of Agriculture, Fisheries and Food estimates that about one half of the total of 328,804 holdings in England and Wales fail to provide full-time employment for at least one person. But as 100,000 in groups (*a*) and (*b*) above, do employ one or more regular hired workers it can be deduced that only about 60,000 of the 228,000 in group (*c*) provide full-time employment for their occupiers. Some of these employ regular female workers or males under 20 or over 64 years of age (serial 10), or part-time or seasonal workers (serial 11)(1).

(ii) The Ministry considers that some holdings requiring less than the full-time work of one man will remain viable units if the farmer has an ancillary occupation and has the technical knowledge to conduct his holding economically.

(iii) The Ministry also expects that smaller businesses using efficient techniques, adequate records for planning and sound marketing arrangements, with the benefit of personal attention, will remain part of the pattern of farming, given ability and willingness to keep up to date. The Small Farmer Scheme is intended to help these businesses.

13. It follows from the high proportion of occupiers among those engaged in agriculture that agricultural education has to cater for many who can expect to have their own farms in due course. These include some of the farmers' sons who constitute one-third of the full-time students in agricultural courses. The expectation of taking over a family holding may have diverse and contradictory educational effects, for example:

(*a*) a boy capable of success at "A" level may leave school early and require further education suitable to his ability;

(*b*) suitable education is needed for those who, whatever their prowess in school subjects, will be in charge of their own businesses.

This element in the industrial structure has tended to encourage the admission to the same courses of students with a wide range of scholastic ability, but their requirements call for as wide a variety of courses as is consistent with the numerical demand. Those who advise young persons on courses should take into account the purpose for which they are seeking education as well as their educational qualifications.

---

(1) For explanation of terms see "Farm Classification in England and Wales, 1963" (Ministry of Agriculture, Fisheries and Food). Her Majestys' Stationery Office price *5s.6d.*

14. The outstanding feature of the structure of the industry—the small labour unit—has one clear educational implication: broad courses in general agriculture appropriate to needs must continue to be the initial provision for a large proportion of farmers and farm workers, who will have to turn their hands to many different jobs that occur during the yearly cycle of operations on the farm. We hope, however, that each individual will continue to build on the knowledge acquired from such courses.

Trends in the Industry

15. The Director of the National Agricultural Advisory Service has forecast the following trends during the next ten years :—

(*a*) Further development in farming techniques and methods.

(*b*) Replacement of much mixed farming by specialised and intensive systems.

(*c*) The growth of large farming units and enterprises likely to be based more frequently on "outside" capital.

(*d*) A movement towards a new order in marketing.

He has, however, emphasised that the rate and degree of development of any one of those trends depends on a number of economic and political influences which cannot be forecast at all precisely.

16. The first three of the foregoing trends will need to be matched by educational provision dealing with specialised branches of production. This provision may take any of the following forms:

(*a*) flexibility in broad courses in general agriculture to allow options directed towards particular branches of husbandry.

(*b*) supplementary and post-diploma courses, following immediately after the above general courses.

(*c*) supplementary and post-diploma courses for former full-time students who have acquired further experience in responsible posts.

(*d*) specialised courses instead of broad general courses, as provided at present in poultry husbandry.

(*e*) retraining courses to equip mature persons to enter a different branch of agriculture.

All these variants are likely to be required, probably with changes in emphasis as the industry develops. In the past a good general knowledge of husbandry before specialisation has enabled students to be reasonably adaptable and not tied to one occupation. We think there are advantages in this, both for the individual and for the industry, and that general courses dealing with all the work of a mixed farm will continue to be necessary. Their aim should be to teach the matter which is common to all specialisms, but at the same time some flexibility in initial courses will be required. With increasing specialisation in the industry on the one hand, and differences in the regional patterns of agriculture on the other, initial educational courses will sometimes be biassed, for example towards animal husbandry or crop husbandry. Suitable students will then be able to proceed to more specialised courses, dealing with one branch of production, and any retraining which they need later will be facilitated by the broader course which they have followed initially.

17. Our evidence suggests that provision to meet these specialised needs is a most important growing point in agricultural education. Stockmen and other skilled craftsmen will increasingly need technical education. In particular, there is a demand for "technicians" who are competent to take charge of particular enterprises, more than for general "managers", and there is often a dearth of suitable applicants for such posts. The necessary courses need to be based on husbandry crafts and techniques and treatment of the subject in depth to a greater extent than is possible in the one year certificate course. It has been urged, we think with reason, that persons who have undertaken specialised study, preferably after an initial general course, would be of more value to employers than those who have taken only a general course; and that provision in this way would quicken the interest of the industry in the contribution that can be made to efficiency by education.

18. The new trends in production usually involve a heavy capital outlay. The problems of securing an adequate return by increased productivity, and of achieving the most efficient marketing arrangements, require that courses should pay attention to business aspects of the farm as a whole and its individual enterprises, in a manner appropriate to the age and ability of the student. In agriculture, with its high proportion of principals, economic considerations should be introduced into courses which would not be treated as at "management" level in other industries(1). For most students the increasing necessity to plan enterprises in the light of cost and market calculations makes technical instruction by itself insufficient. We would, however, like to add a warning against attempts to deal with these matters by adding another subject to the curriculum. The business aspects of farming must enter into the approach to all subjects, producing the right attitude of mind for dealing with the problems of production. The teaching farm, as a commercial unit, is available for illustration and should be used to the utmost for this purpose.

19. All the trends which have been forecast imply that those adults who are already in agriculture will have to accommodate themselves to continued technical and commercial change. Both farmers and workers, whatever their prior academic achievements may have been, can be helped by the further extension of the services that educational establishments offer to mature persons.

Ancillary Occupations

20. The structure of agriculture, with its very large numbers of small units, has not been favourable to the organisation of research and advisory services by the industry itself and these functions are mainly the responsibility of official bodies. Agricultural graduates and diploma holders are required by these bodies and also by the teaching service. One source of teachers of rural subjects in schools is the holders of diplomas in agriculture or horticulture, who have also taken a special one-year course of teacher-training(2). In agricultural education the products of good technologically-orientated diploma courses, who have a sound experience of practical farming, will form an essential part of the future teaching force, and these too will need adequate teacher training facilities, including in-service training.

---

(1) See Appendix B.

(2) The special one year courses are offered at Newton Park (Bath) and The City of Worcester Colleges of Education.

21. The industries ancillary to agriculture, concerned with the manufacture and distribution of agricultural machinery, equipment and supplies and the marketing, distribution and processing of produce, also employ qualified persons. These industries have posts to which they appoint diploma holders but not graduates, as well as posts for which both are considered. There are also many comparatively small merchants' firms, which have hitherto relied on recruits acquiring experience in the course of their employment, but which are now showing an interest in the vocational education of their employees.

22. The representative associations of the ancillary industries have supplied us with information on their recruitment of diploma holders and with their views on educational courses. By far the largest single occupation of diploma holders in industry is that of sales representative or field officer. Quality testing of products is another important occupation. There are posts as managers or foremen of farms owned by manufacturers or processors, and some of these also employ advisory officers. A number of manufacturers have research organisations for which they require qualified staff.

23. Employers expressed a fairly general satisfaction, subject to the comments below(1), with their present diploma employees and with the content of diploma courses for the posts involved.

24. It is clear from the evidence that employers expect diploma holders to have had practical farming experience which may often give them an advantage over graduates for posts open to both. Whilst recording with satisfaction that diploma holders have had such experience, many of the replies make it clear that they cannot have too much. "It is doubtful whether it goes far enough to make diploma courses effective as a preparation for business posts." "A large company prefers diplomates with post-diploma experience because of the advantage of the broader experience gained in other organisations before embarking on sales advisory duties. Some smaller companies not possessing such extensive training facilities prefer recruits who have had wide practical experience and would prefer diplomates taking longer systematic courses of practical training before the diploma course, or as part of it." These employers generally accept that they must themselves provide the opportunities for their staff to obtain experience of their own specialised operations. A number of them have offered also to provide similar opportunities for students attending courses.

25. The most common criticism made by employers was that recruits lacked sufficient knowledge of the commercial side of farm and other businesses. "It would be advantageous if more emphasis could be placed on financial management as not only is this particularly important but it is an aspect of farming with which many diplomates seem to be unfamiliar or one to which they pay least attention." "Firms which point to shortcomings mention particularly inadequate attention to the commercial aspects both of the farm business and of the merchant's business." "Training ought to give a big place to the economic application of technique." "Instruction in business economics would help to correct the somewhat theoretical approach to practical commercial problems sometimes found in new recruits." "The syllabus . . . does not deal adequately with marketing and Marketing Boards."

---

(1) See also paragraph 63.

26. The criticisms in the preceding paragraph probably relate to students who attended courses in earlier years rather than to those who have qualified recently. Current initial general courses, as well as post-diploma and supplementary courses, are paying increasing attention to commercial considerations. Nevertheless, it is important to note the emphasis which the ancillary industries place on these matters. We have already recorded, in paragraph 18, the need to deal with the business aspects of production techniques at the farm level rather than as a separate study of economics, for farmers and farm workers. The more specialised educational requirements of each of the ancillary occupations, or of groups of them, could best be met by supplementary, post-diploma or short courses for persons who have completed general courses and are in employment.

Conclusions

27. The evidence we have received about the present and likely future occupational structure and the trends in agriculture, and the requirements of the occupations related to it, has led us to identify the following principal educational needs.

(*a*) Continued initial provision of broad courses in general agriculture (paragraph 14), but with some flexibility to allow variations between them (paragraph 16).

(*b*) More educational provision dealing with specialised enterprises (paragraph 16), including courses for technicians (paragraph 17).

(*c*) Adequate treatment of the business aspects of farming and of related industries in educational courses (paragraphs 18 and 26).

(*d*) Much more extensive educational provisions for mature persons, including farmers, farm managers and farm workers (paragraph 19) and persons in ancillary employments (paragraph 26).

28. In translating these needs into educational requirements the classification of personnel which has become usual in technical education can serve as a useful guide, although its application to agriculture is obscured by the absence of a clearly defined careers structure to which educational courses and qualifications can be related. Some comments are added here on the roles of the various groups of personnel in agriculture and related occupations as a supplement to the general definitions which are given in the Glossary at the end of this report. We would expect a decline in the number of workers who, as *operatives* (or as general duty men), have carried out routine manual tasks which are learned mainly, but by no means entirely, by practical experience. These tasks will have an increasingly significant requirement for technical knowledge at an elementary level and further education will be required as well as industrial training. *Craftsmen* also carry out routine tasks but in relation to specialist husbandry work, and must understand the underlying basic principles and reasons for new techniques. This type of knowledge will become increasingly essential for all those engaged in farm work at this level and a sustained demand for appropriate courses of further education can be expected. *Technicians* will be responsible for production units at a level between operatives or craftsmen and management. They must be capable of both carrying out and fully understanding the processes involved and the underlying principles. Technicians are also in

demand in the ancillary industries. *Foremen*, in agriculture as in many other industries, have very largely acquired their knowledge on the job. Persons occupying these positions in charge of farm enterprises in future will increasingly require a sound technician training and education, as well as ability to organise the enterprise efficiently and a knowledge of the economic reasons for adopting particular techniques. Educational courses, which will have to specialise at appropriate stages, can make an increasing contribution to the efficiency of the industry at this level. In an industry in which progress depends, inter alia, on science, the *technologists*, who are qualified to apply scientific knowledge to production, will have an increasingly decisive role to play. They may be engaged in farming or be employed in ancillary industries, in the advisory services or in teaching. Advanced courses of education will be required for them. *Farm managers* are responsible for the overall conduct of the farm as a business. They must understand the principles of farm management and the underlying economic factors, together with the techniques required for the development of a business policy for the farm and its day-to-day operation. More educational provision will be needed for those who have acquired experience after their initial qualification.

Chapter 2. NUMERICAL DEMAND

Agricultural Production

29. Because of the structure of the industry we were not able to obtain from employers any definite forecasts of demand for the products of full-time courses. We have thus been forced to use more general data. The following paragraphs record some facts about recruitment to the industry and the numbers receiving vocational education, and draw some deductions from this information and from the evidence we have received.

30. Recruitment and education may be compared in terms of annual age groups. The Ministry of Agriculture, Fisheries and Food estimates that there is approximately a 3½ per cent turnover annually among the occupiers of commercial holdings as a whole. Applying this figure to the 160,000 occupiers of "full-time" commercial holdings(1) the annual replacement rate would be between 5,000 and 6,000. The number of regular whole-time male workers aged 20-64 years employed in 1964 was 250,000. As their number has been declining in recent years by over 10,000 a year(2) it is difficult to assess with any precision the annual replacement rate required, but it is unlikely to be more than about 5,000.

31. In 1964 15,276 boys under 18 years(3) entered agriculture for their first job; but it is known that some of these young entrants soon leave. A better guide to the number of young men intending to make a career in agriculture is given by the number of 18 and 19 year old males employed whole-time in the industry. The average number in each of these two age groups was 10,500(4). But again since some of these subsequently leave the industry, and allowing for student and other entrants to the industry at over 19 years of age, the net recruitment measured in this way is probably not more than 10,000.

32. Statistics of agricultural education which may be compared with the above figures are:

(*a*) Average *age group* of boys under 18 released from agriculture for part-time day courses	1,200
(*b*) Male students leaving full-time courses each year (including university: 80) for practical agriculture and horticulture	1,700 – 1,800

Over 400 of the full-time students are recruited from part-time courses so it appears that, discounting this duplication in the above figures, an age group of about 2,500 have full-time or part-time day vocational education at some stage early in their careers. These constitute about one quarter of the entrants to the industry, as assessed in paragraphs 30 and 31.

---

(1) Paragraph 9.

(2) The decline in manpower of 142,000 between 1964 and 1970 forecast in The National Plan, 1965 (Cmnd. 2764), relates to agriculture, forestry and fishing in the United Kingdom. An estimated 111,000 of this decline is attributable to agriculture in England and Wales, including 60,000 regular whole-time male workers, aged 20–64, and smaller numbers of occupiers, other male whole-time workers, female, part-time and casual workers.

(3) Source: Ministry of Labour Statistics.

(4) Based on Ministry of Agriculture, Fisheries and Food Census Returns.

33. The number of occupiers and of employed workers in agriculture is declining each year, but we expect the proportion of entrants seeking educational preparation for their careers to increase. All the trends noted in the previous chapter will be dependent on higher levels of technical and commercial knowledge and competence, and employers making a high capital investment per worker may be expected to concern themselves increasingly with his ability to manage stock and to use expensive machinery and equipment to the best advantage. The proportion of new entrants who receive some form of day-time education is higher in most other industries than in agriculture, but the establishment of an Industrial Training Board for agriculture with a statutory duty to determine the training requirements of the industry and to see that they are satisfied should result in a substantial increase in the number of young persons attending educational courses. These general arguments are reinforced by the record of recent years, during which declining recruitment to the industry has been accompanied by an increase in the number of students receiving education:

Table 3

Recruitment and Education

	1954–55	1964–65
Boys and girls aged 15–17 entering agriculture	21,429(1)	17,507(2)
Full-time and sandwich students in agricultural courses outside universities	2,994	3,929
Part-time day students in agricultural courses	1,616	8,592

These are total figures, unlike the calculated age groups in the preceding paragraphs.

34. We are thus persuaded both that the industry needs better educated personnel and that there will in fact be a sustained demand for the extension of educational provision in some directions. We attach the greatest importance to this provision taking the form of courses of the right type and quality, and the evidence which we have received enables us to give some indications, both negative and positive, of the directions in which education at the higher levels should move. Information presented by the educational establishments shows that about one half (some 250-300) of the diploma holders and about three quarters of the students leaving supplementary courses in 1963 and 1964 entered practical agriculture (including horticulture). We believe that some of the others would have preferred to do so had they found a suitable opportunity. There is clearly no advantage in attracting more students to courses which do not enable them to satisfy their aspirations, and the types of opening available in farming are of crucial importance.

35. First, a warning is necessary about courses that purport to deal generally with farm management. Management is usually taken to include the control of a labour force. We have noted in Table 2 (paragraph 11) that there are approximately 11,000 holdings employing five or more regular whole-time men. The annual replacement of occupiers or managers of these hold-

---

(1) Year 1954.
(2) Year 1964.

ings, at 3½ per cent turnover, would be about 400. The Ministry of Agriculture, Fisheries and Food has informed us that 12,720 managers were recorded in the 1960 Census, of whom the greater number did manual work and were returned in the annual June Census of workers. Only about 2,500 of these were in sole charge of farms, acting for the occupiers, and their annual replacement rate on the above basis would be of the order of 100. These sobering figures may help to explain why those advertising for managers are overwhelmed by applicants, though they do not explain why so many persons with inadequate training and experience apply.

36. On the positive side we have already recorded(¹) a firm demand for "technicians" who are competent to take charge of individual husbandry units. We have also been led to believe that there is great scope for the expansion of educational provision for mature persons who are already exercising managerial responsibility, especially in the form of short advanced courses for farmers and managers over 25 years of age. Further, it is apparent that with a faster rate of change, short courses at all levels will be required to help farmers and workers of all ages to keep themselves up-to-date. This type of provision deserves much higher priority than it has been accorded in most areas.

Ancillary occupations

37. Evidence has been received from organisations representing employers. Omitting teachers, they employed some 2,000 holders of diplomas in agricultural subjects. Their average annual recruitment has been of the order of 150 and they take about 20 per cent of the output of diploma courses. With a few exceptions these organisations forecast a need for recruitment on about the same scale as hitherto or on a somewhat larger scale.

38. Organisations recruiting holders of the National Diploma in Agriculture generally found no scarcity of applicants for posts. Some difficulties were found in recruiting enough persons with more specialised qualifications: there are vacancies for holders, of a suitable calibre, of the National Diploma in Poultry Husbandry; too few qualified persons, especially men, are coming forward for the higher posts in creameries; representatives of the horticultural industry link the shortage of suitable candidates with the need for courses geared to the requirements of the industry.

39. It is estimated that there are 400–500 teachers whose main qualification is one of the agricultural diplomas, and about 100 of these teach rural subjects in schools. Assuming the development of full-time courses in county institutes as envisaged in currently approved schemes of agricultural education, the continued expansion of part-time day courses, and a five per cent annual growth in the number of these teachers in schools, it is estimated that some 50 new holders of agricultural diplomas a year will be required to cover growth and wastage among teachers.

Overseas demand

40. More than a hundred students from overseas now attend one year and two year courses. They have to adjust themselves to life in this country as well as to farming conditions, and they often find difficulty in obtaining

---

(¹) Paragraph 17.

opportunities for practical experience on British farms. The various arrangements which we propose in the next chapter should make it easier for them to obtain practical training associated with their courses. As general courses at the more elementary levels become available in their home territories it may be expected that the interest of overseas students will turn increasingly towards advanced or specialised courses.

41. The evidence that we have received gives little indication that many United Kingdom diploma holders proceed to overseas posts upon completion of their courses. Our enquiries to the agencies which are concerned with the recruitment of qualified staff for official posts in the Commonwealth have not elicited any definite information on future demands from this source. Accordingly we have no grounds for believing that overseas employment will have any significant influence on the trend of demand for places.

Conclusion

42. The number of persons engaged in agriculture has declined substantially and is expected to decline further. The industry is engaged in a rapid redevelopment through which production is increasing in spite of a declining labour force. We are unanimous in our view that this improvement in productivity can only be satisfactorily maintained if a much larger proportion of the entrants into agriculture receive adequate technical education and it is this extension of the coverage of further education that will maintain enrolments in full-time courses. On the evidence available to us, we conclude that the number of places now provided in general courses above the certificate level will be broadly adequate for some time to come for those who enter agricultural production. The provision of courses to meet the needs of specialisms would be likely to increase numbers, and, in addition, there is a firm demand from the ancillary occupations, many of which also require recruits with specialist qualifications. The adequacy of accommodation for the development of full-time, sandwich, block release and short courses will need to be kept under review.

Chapter 3. EDUCATION AND TRAINING

Principles

43. The preparation of new entrants for their future careers in agriculture and ancillary industries is a combined process involving both industry and the education services. In considering the respective roles of industry and the educational service, we have been guided by the following principles:

First—Further education, insofar as it is distinguishable from practical (industrial) training, may be regarded as being generally the responsibility of the education authorities;

second—practical (industrial) training may be regarded as being generally the responsibility of industry; and

third—further education and industrial training are complementary aspects of a single process(¹) and must be planned and supervised as a whole.

A Requirement of Education

44. The linking of further education with farm experience has special significance for students proceeding to full-time agricultural courses:—

(*a*) *for the individual:* entrants from outside the industry (who constitute two thirds of the students) need to satisfy themselves through authentic experience that they are making the right choice in adopting farming as a career;

(*b*) *for the courses:* these presuppose a general acquaintance with the range of annual farming operations and their interactions and an appreciation of the role of science in farm production. The student in the craft and technician courses should have begun to acquire skill in farm operations. Students entering science-based courses need to understand the significance of practical operations and their interdependence in the seasonal cycle. The facilities of teaching farms and holdings are used for illustrating the theory which is being taught, for giving formal instruction in skills, and for filling gaps due to limited previous experience, but they cannot offer opportunities for the full range of practical experience in production which is required by each student.

45. Whereas a year in any job on the land might enable the individual to make up his mind whether to stay in agriculture, much fuller experience during the time spent on the farm is needed as a preparation for courses dealing with animal or crop husbandry. Most of the initial courses are general in character and cover the wide range of operations undertaken on a mixed farm. The teacher tries to help the student to relate the individual

---

(¹) The Central Training Council established under the Industrial Training Act, 1964, after pointing out that the provision of skilled training has always been accepted to be industry's responsibility, while the education service has been provided by education authorities, emphasizes that "further education and training are complementary aspects of a single process".
Memorandum No. 1 Central Training Council, Ministry of Labour, April, 1965.

elements of his practical training to his education as a whole, and the absence of suitable practical experience is bound to hamper this process of education.

46. Despite the normal requirement of a period of a year or more on a farm as a condition of entry to full-time courses, we have received much comment from associations representing teachers and education authorities on the failure of students to obtain adequate experience. Many of the students who have attended courses in general agriculture have had too narrow a range of experience, and those who have entered specialised courses, for example in poultry technology and certain branches of horticulture, have encountered even greater difficulties in obtaining practical experience in appropriate specialised enterprises. These criticisms are often echoed at a later stage by farmers and growers who complain that students are completing their courses with inadequate knowledge of modern production techniques.

A Problem of the Industry

47. Whilst we are concerned here with the practical training of full-time students it is relevant to note the size and complexity of the potential training tasks of the industry:

(*a*) In 1964 approximately 35,500(1) young persons under 18 years were in regular whole-time employment, one-tenth of the total of all ages so employed (333,124). These figures include intending full-time students who were obtaining their practical experience.

(*b*) There are approximately 100,000 holdings employing one or more regular whole-time male workers aged 20–64 years; a further 21,000 employ males outside this age range or women whole-time.

The distribution of young workers among a multitude of small labour units shows the very personal nature of the training problem in agriculture. Providing suitable practical experience for about 3,000 full-time students is part of it, but it must be acknowledged that in the past the individual employer has not always had much incentive to provide such practical training. The student constitutes an additional supply of labour but he will leave soon after he has begun to pull his weight, especially if he is given suitable experience of a wide range of crafts; and he is unlikely to return to the same farm after his course.

48. The prospects for training have now been transformed by the Industrial Training Act, 1964, and the Industrial Training Board for agriculture which is expected to be established soon. This Board will have the statutory responsibility for determining the scale and type of training required to meet the needs of the industry and for making recommendations about the training to be given at all levels of employment. Grants will be payable to employers who provide industrial training of an approved standard, and the costs will be met by a levy on employers, so that the training will become the responsibility of the industry as a whole rather than of a minority of employers. The Board may be expected to follow the practice of the others which have been established under the Act of prescribing that approved training schemes

---

(1) The Ministry of Agriculture, Fisheries and Food June Census 1964 showed 29,250 boys. Girls under 18 are not shown separately, but assuming the same proportion of boys and girls as in the Ministry of Labour statistics of young persons under 18 entering agriculture as their first job (1964, 15,276 boys, 2,231 girls, 17,507 total), the number of boys and girls under 18 years would be 33,522.

shall incorporate appropriate further education; but the educational element will remain the responsibility of the education service. We expect that the general training measures in the industry will greatly strengthen the practical farm experience of full-time students. Meanwhile, in the remainder of this Chapter we make various proposals and suggestions for improving the links between education and training.

Methods of Combining Education and Training

49. It has been widely assumed in evidence that training on the farm and courses of full-time education will continue to be separate and consecutive, despite the acknowledged shortcomings of much of the time at present spent on farms. Even in the rare cases when the range of experience obtained is adequate, this arrangement has the disadvantage that there is often little or no effective link between the student's educational and practical periods. Our third principle is based on the belief that these should be treated as a whole, and there are a number of ways in which this might be effected:

(*a*) Preliminary practical experience can be accompanied by part-time and block release education. (Our returns show that only one-third of diploma students have attended further education courses after leaving school, and this includes the 10 per cent who are recruited from full-time certificate courses.)

(*b*) A short course at the chosen educational establishment before or during the practical period. Attendance in the normal college vacation has been suggested.

(*c*) Spending the vacations of full-time courses in gaining experience of different types of agriculture, rather than in employment which is irrelevant to the course.

(*d*) Sandwich courses, in which periods in college and in industry, which may be of varying lengths, are planned and supervised as a whole(1).

The first method should be normal for trainees who have not already received some full-time agricultural education and are not directly under the supervision of the establishment where they intend to continue their studies. The second and third methods can obviously lead to the mutual benefit of both education and practical experience, and we do not wish to discourage them, but in themselves they do not necessarily achieve the full integration of education and training, partly for seasonal reasons. In particular the third method does not represent a true sandwich arrangement. Sandwich courses deserve much fuller consideration.

Sandwich Courses

50. Views on sandwich courses differed among those giving evidence. The authorities of some teaching establishments favoured their development; whereas others did not. The National Farmers' Union said it would commend them, subject to the periods of employment being on well-chosen commercial

---

(1) A further possibility is the provision of practical training on farms belonging to educational establishments. The number of trainees must obviously be limited, but we understand that this system operates in Northern Ireland. There may well be scope for it in special branches, such as intensive livestock husbandry, and there are accepted arrangements for industry to pay education authorities for providing training.

holdings and supervised as part of the complete course of education and training. About one half of the organisations who replied from the ancillary industries said they would welcome them and some made the point that sandwich arrangements would offer an opportunity to obtain experience in these industries as well as in farming.

51. The integration of education and training implicit in sandwich courses requires close consultation between employers and teachers. The training employer needs to be aware of the phasing of the teaching programme and to be fully informed about the ground the student is expected to cover on the farm or other place of employment. The teacher needs to know what training facilities the employer is able to offer and to ensure that they are used to the best advantage to illustrate the course. He should remain in contact with the student during any lengthy absence of the latter from the teaching establishment, either by visiting him, by arranging for him to come back to the establishment occasionally, or by a combination of the two.

52. Sandwich courses are one of the most effective ways of integrating education and training. It would seem to follow from what has already been said about the educational need for adequate training in agriculture that this industry is second to none in the need for them. We have not encountered opposition to them in principle but we have noted numerous allusions to the difficulties which face any attempt to supervise training and education as a whole. These must be overcome if the full benefits of each are to be reached. We therefore recommend that new courses which require the equivalent of two or more years of full-time attendance at an educational establishment and which are intended to be the initial full-time courses for the students concerned, should, wherever possible, be organised on a sandwich basis.

53. In making this recommendation we have been encouraged by experience already gained in a sphere where it has been particularly difficult for students to obtain satisfactory practical training in commercial enterprises, namely in horticulture. The Pershore Institute of Horticulture has introduced a three year sandwich course in Nursery Practice, with the support of a Nursery Advisory Committee, which includes members from the two interested trade organisations. The Committee's functions include planning the Institute's nursery and advising on the industry's requirements in the formulation of the syllabus of technical, business and practical training. It provides the list of co-operating nurseries for the student's year in the industry, and its members assist in the assessment of students by acting as observers and examination assessors and by conducting practical proficiency tests. In these ways the industry is actively involved in all three years of the course and has a real influence on it. The student remains under the tutorial guidance of the Institute during his industrial year, and he is given a project to undertake which has been planned by both employer and Institute and which forms an essential part of his final assessment. He is visited by his course tutor during the year, and is in correspondence with him frequently. One invaluable, if secondary, result has been the great benefit to teaching staff of a much closer, more intimate, link with the grower. A spell of experience on the Continent is usually included in the industrial year of the Pershore student. We have been informed that, while these arrangements have required a more flexible outlook on the part of the teachers, the Institute has been inspired by this real partnership between education and industry to

start negotiations with a view to extending the sandwich principle to other courses. Another horticultural example is the three year sandwich course in Glasshouse Production at the Hertfordshire Institute of Agriculture and Horticulture. Sandwich arrangements have also been introduced in a general agriculture course and a poultry course. Their acceptance in other industries is demonstrated by the increase in the number of sandwich students from 1,000 in 1953–54 to 22,000 in 1964–65.

54. Sandwich courses may be organised with alternate periods in industry and in full-time education varying from a few months to a full academic year, depending upon the requirements of the student, the needs of the course, and the convenience of the employers and the educational establishment. The various possibilities were described in the Report made to the Council in 1963 by the Advisory Sub-Committee on Sandwich Courses(1). The Report stated that the most common types for courses involving the equivalent of three academic years in college were the "thin" sandwich course in which the college and industrial periods alternated at approximately six-monthly intervals and the "thick" sandwich course where the first two years were spent in college, the third in industry and the fourth in college. Among the alternatives cited were:

First three years—six months in college, six months in industry.
  Fourth year—full-time in college.

First two years—six months in college, six months in industry.
  Last two years—full-time in college.

First year—three months in college, nine months in industry.
  Second, third and fourth years—full-time in college, then a further nine months in industry.

First and last years—full-time in college. Second year—first term in industry, last two terms in college. Third year—first term in college, last two in industry.

In agriculture it may be necessary to spend a higher proportion of the total time in the industry, and to arrange for at least one industrial period to cover a full year, thus embracing all the seasonal operations. One institute is developing a sandwich course linked with initial part-time education for the young entrant as follows:

> First two years—part-time day course and supervised training. Third year—full time at institute. Fourth year—supervised training in industry. Fifth year—full-time at institute. Any students who obtain their practical experience in other areas during the first two years are reported to the appropriate local education authority for part-time courses.

Some Problems of Organisation

55. We record the following further observations on organisation:

(*a*) Arrangements are needed to enable students to secure an adequate variety of experience, possibly on different farms. We endorse the suggestion we have received that training farms suitable for providing experience for intending full-time students should be approved and listed. We refrain from making a precise recommendation about the form of approval and maintenance of the list because these are matters in which the Industrial Training Board may be expected to play an important part in co-operation with the authorities of the teaching establishments.

---

(1) National Advisory Council on Education for Industry and Commerce. Report of the Advisory Sub-Committee on Sandwich Courses.

(*b*) Employers need guidance on what is required of them and a point of reference for advice. We have given some thought to the first of these items in relation to the current certificate and diploma courses, but we consider that it will need much fuller examination in relation to the sandwich courses which we are proposing. The second is connected with our next observation.

(*c*) The authorities of educational establishments should be involved in the training of their students, through contact with both employers and students during their periods of practical experience, and generally through the help they can give in its supervising. In addition local education authorities can play a vital part by providing part-time and block release courses during the training periods of students whose full-time attendance may be at an establishment in another part of the country.

(*d*) Officers of the advisory services of the Ministry of Agriculture, Fisheries and Food can be of great assistance, as teachers, in giving validity to teaching from their own experience and, in the course of their normal contacts with the industry, they can help in bringing the educational provision to the notice of farmers.

(*e*) Youth Employment Officers need to be aware of the requirement of practical experience for admission to full-time courses, and of the need for specialist advice on education and training for agricultural employment.

Chapter 4. COURSE ORGANISATION

Principles

56. Our consideration of the future pattern of educational courses for agriculture has been based on the following principles:

First *Suitability*

Agricultural courses should be related to the structure and needs of the industry and the ultimate prospects of those who enter it.

Second *Opportunity*

School leavers should be able to enter agricultural education at the same stages as they enter other vocational courses.

Third *Progression*

There should be avenues for progression in agricultural education similar to those found in other forms of vocational education.

First Principle : Suitability

57. In Chapter 1 we outlined the diversity of the educational needs of the occupations that are served by agricultural education.(1) Agriculture is spread throughout the country, in comparatively small labour units, with numerous specialised activities. The number of students who require any particular type of course is often small. A suitable pattern of education has to be achieved; but structural, technological and business developments in agriculture and related occupations, and the progress of secondary education, may necessitate modifications from time to time in the length of courses, the respective roles of part-time and full-time education and the proportions of students in elementary, senior and advanced courses. The conditions in the industry must guide the application of the second and third principles.

Second Principle : Opportunity(2)

58. The second principle aims at offering appropriate agricultural courses to school leavers at all levels of attainment, and thus securing for agriculture its share of pupils at each level to meet the needs which have been outlined. Its application, which should encourage students to take courses at the highest level of which they are capable,(3) requires (*a*) part-time and (*b*) full-time and sandwich courses leading from various stages of general education. As a guide it may be useful to refer to the range of courses serving other industries, which is broadly that shown in the table following.

---

(1) See especially the summary in paragraphs 27 and 28.

(2) This section in particular contains a number of abbreviations and terms which are defined in the Glossary.

(3) We cannot say more than " encourage " this. We have referred in paragraph 13 to the need to take account of the student's objective, which may be well-defined in the case of a farmer's son.

Table 4

General Pattern of Further Education Courses for School Leavers

Leaving School after Secondary Course lasting	*Further Education Courses*
4 or 5 years	Operatives' courses (part-time). Craft courses (part-time).
5 years (with less than 4 'O' levels in the General Certificate of Education).	Craft courses (part-time). General (diagnostic) courses (1 or 2 years part-time).
5 years (with appropriate subjects)	Technician courses (part-time).
5 years (with 4 or more 'O' levels)	Ordinary National Certificate courses (2 years part-time). Ordinary National Diploma courses (2 years full-time or corresponding sandwich periods).
7 years (with 1 or more 'A' levels and appropriate 'O' levels).	Higher National Certificate courses (2 years part-time). Higher National Diploma courses (2, 3 or 4 years full-time or corresponding sandwich periods).
7 years (with 2 'A' levels and appropriate 'O' levels).	Degree (and, hitherto, Diploma in Technology) courses (3 years full-time or 4 years sandwich).

59. In agricultural education, outside universities, there are only two levels of recruitment from the General Certificate of Education range: certificate courses nominally requiring three passes at the Ordinary level of the General Certificate of Education or passes at Stage I examinations following part-time courses (and obtaining them from one-half of the entrants); and diploma courses requiring four or more passes at the Ordinary level (and securing many students who possess more than the minimum qualifications). The only recent addition to the range is the course leading to the Diploma in Poultry Technology which requires two passes in specified subjects at the Advanced level and passes in appropriate subjects at the Ordinary level.

60. Despite these nominal requirements there is a wide spread of General Certificate of Education qualifications held by students in current full-time agricultural courses:

Table 5

Students in full-time agricultural courses 1964–65

	Diploma	*Other*	*Total*
Students without 'A's			
No 'O's	14	1,203	1,217
1–2 'O's	15	383	398
3–4 'O's	72	377	449
5 or more 'O's	902	476	1,378
Total without 'A's	1,003	2,439	3,442
Students with 'A's			
1–2 'A's	300	104	404
3 or more 'A's	52	31	83
Total with 'A's	352	135	487
Grand total, full-time students ...	1,355	2,574	3,929

The introduction of the Certificate of Secondary Education will probably increase the number of pupils with school leaving qualifications equivalent to the lower General Certificate of Education groups in the table. Grade I in the former is accepted as equivalent to the Ordinary level in the latter, and should be read as an alternative throughout this report.

61. The above spread of qualifications suggests that it is now possible to organise a wider range of agricultural courses, with each type geared to different entry levels. The following advantages could be expected:

(*a*) More effective organisation of teaching with a more homogeneous group of students. (A special study which we have made of students leaving diploma courses in 1964 has shown a positive correlation between entry qualifications and final results.)

(*b*) The opportunity for students to enter courses which are planned to continue from the stage they have reached at school.

(*c*) Similarity with other industries, both in the openings available to students and in the nomenclature of courses, which has been advocated from the points of view of those who are concerned with advising on careers and of employers.

(*d*) The possibility of providing greater variety to suit the needs of the industry.

62. The main consideration limiting the range of courses is the comparatively small number of students who may require a course of a particular type. This is a very real problem with part-time courses which are necessarily spread over all counties. It is not so serious a problem with full-time residential courses provided on a regional or national basis, in which the solution is to control their number.

63. The development of courses in agriculture and horticulture with an entry requirement involving specified subjects at the Advanced level is now desirable. The number of pupils leaving school with passes at this level has doubled in the past ten years. Many leave with only one such pass and thus do not qualify for admission to degree courses—in 1964 there were 7,290 boys in this group, of whom 2,850 had passed in a science subject. The raising of entry conditions to the Advanced level attracts pupils who are appropriately qualified and encourages pupils who are interested in proceeding to the further education courses to complete their sixth form studies. The National Farmers' Union and half the employers in ancillary industries have stated that they would welcome some technological courses higher in academic level than the present diploma courses.

64. It was emphasised in the White Paper on Technical Education(¹) that care should be taken in the selection of students for courses, so that they are as far as possible placed where they can do best and have a reasonable prospect of completing their courses satisfactorily. A wider range of courses will facilitate this process of selection. For admission to agricultural courses it would be necessary to specify a science requirement both for the Advanced level entry and for the Ordinary level entry mentioned above. The statistics in Table 5, paragraph 60, relate to all passes in the General Certificate of Education.

(¹) See footnote to paragraph 5.

Third Principle: Progression

65. The third principle aims at giving opportunities for advancement to promising entrants to the industry, so that both they and the industry make the best use of their potentialities. This principle also recognises that ability is not necessarily correlated with age of leaving school. It requires that a student who leaves school without the academic qualifications for admission to a particular course should be able to qualify for it along the further education route, and that the conditions of entry to courses should be defined in easily recognisable terms already in use in further education, as well as in terms of the General Certificate of Education as at present. For example, entry to Higher National Diploma courses should be open to students who have gained the Ordinary National Certificate or Ordinary National Diploma as well as to those with G.C.E. qualifications at the Advanced level. The application of the second and third principles, no less than of the first, is important to the future well-being of the industry.

Proposals

66. A possible pattern of full-time courses above the level of the existing one year certificate courses, which would accord with the above principles, is given in the appended chart. It shows, from left to right, routes from school to further education, and also indicates the part-time further education courses which would equip a student to enter full-time courses at higher levels. The broad career levels for which the courses are intended as preparation are shown on the right of the chart.

Courses suitable for students with four passes at the Ordinary level of the General Certificate of Education or the equivalent

67. Full-time *Ordinary National Diploma type courses* related closely to practical husbandry would meet the needs of the " technician " who is likely to be in increasing demand to take charge of highly capitalised enterprises and of many of those who aspire to run farms on their own account. Suitable types of candidate would include some of those who, at present, attend full-time certificate courses and return for a second year, and some of those who, at present, enter current two year courses without having attained the Advanced level of the General Certificate of Education. Normally Ordinary National Diploma courses recruit students with the necessary academic qualifications—four or more passes in appropriate subjects at the Ordinary level or suitable performance in a preparatory General further education course(1) —at the age of 16 or 17. We think that in agriculture also it is desirable that further training and education from this stage should be under the supervision of the educational establishment which the student will attend. For the reasons given in Chapter 3, however, he will need practical experience on a farm quite early and this suggests the desirability of two substantial periods of practical training, one early in the course and one at a later stage.(2) A sandwich course organised in this way, and providing the equivalent of two full academic years at the educational establishment, might extend over a total of four years. It is shown in the chart as a three or

---

(1) See paragraph 73.

(2) See paragraph 54 on the flexibility of sandwich arrangements.

four year sandwich course. This arrangement lends itself readily to courses which start on a broad basis and introduce specialisation later. In view of their duration and their practical content we would regard Ordinary National Diploma courses in agricultural subjects as ends in themselves, rather than as normal routes to advanced courses.

Courses suitable for students with one pass at the Advanced level of the General Certificate of Education or with the Ordinary National Certificate

68. The evidence suggests that there is a demand for a science-based *Higher National Diploma type course* for those who intend to enter practical farming. Suitable types of candidate would be those who, at present, enter diploma courses with a pass in science at the Advanced level,(¹) others with this qualification who might be attracted by a course designed to proceed from this level,(²) and those who qualify through an Ordinary National Certificate course.(³) Some who will have obtained an Ordinary National Diploma might also seek admission ; but as a normal route we would expect those who leave school with four or more passes at the Ordinary level, and who wish to enter a Higher National Diploma course, to qualify for admission through a two year part-time Ordinary National Certificate course. The higher level of entry, as compared with that required for the present two year diploma course, would go some way towards relieving the pressure on the time-table. We propose that, at this juncture, general courses of Higher National Diploma standard should be organised to provide the equivalent of two full academic years in the teaching establishment, preferably as sandwich courses extending over three or more years. Students who wish to specialise will be able to attend the appropriate establishment for a post-diploma course. With the limited field of candidates available it would not be prudent to introduce the further complication of a three year full-time general course, or the sandwich equivalent, at this level of entry. We think it preferable that such courses should require a higher academic standard of entry.

Courses suitable for students with two passes at the Advanced level of the General Certificate of Education or with equivalent attainments in the Ordinary National Certificate

69. A limited provision of three year full-time diploma courses has been advocated by many organisations which have given evidence. We are concerned here with courses which are essentially technological, related to production. They would be particularly appropriate for those aspiring to the management of large farms and for those intending to enter teaching, advisory work and some branches of research. Such courses could be provided in universities awarding their own degrees and we understand that the four year sandwich course in horticulture which has been started by the new University of Bath is intended to be of this type. They could also be provided at some of the agricultural establishments with which we

---

(¹) See paragraph 60 and Appendix D, Table D.
(²) See paragraph 63.
(³) See paragraph 74.

are dealing and lead to *a degree of the Council for National Academic Awards.* This type of development was envisaged by the Committee which met under the Chairmanship of Lord Robbins.(¹)

70. It follows from our conclusions on numerical demand in Chapter 2 and from the number of Advanced level students shown in paragraph 60(²) that we would not expect there to be justification for many agricultural degree courses outside universities in the foreseeable future. Not more than one leading to a degree of the Council for National Academic Awards is likely to be needed in any particular subject, and the criteria which we define later(³) would be relevant to its location. We agree with the Committee which met under the Chairmanship of Dr. Bosanquet(⁴) that it is important to avoid the proliferation of centres providing higher technological education in agriculture. We also agree with the Committee that the two-year diploma courses should not all be displaced and that the proposed three year diploma provision, with a higher entry level, would be eminently suitable for the future manager of large farms. Our evidence, however, would not lead us to endorse any implication(⁵) that agricultural establishments should ignore other employments which also need recruits who have been educated in courses firmly based on the techniques and

---

(¹) Report of the Committee on Higher Education: 1963. Cmnd. 2154:—

"The Agricultural Colleges

443. Finally, we come to the eight Agricultural colleges—five in England and Wales and three in Scotland. At present all the colleges provide two-year courses with a minimum entry standard at the Ordinary level of the school leaving examinations. . . . The colleges may in due course raise their entry standards to the Advanced level in the General Certificate of Education and may lengthen their courses to three years; and eventually courses of degree level may be practicable. Arrangements will then be needed so that suitable students may earn degrees."

(²) A more detailed analysis of students in the 1963–64 session is given in Appendix D, Table D.

(³) Paragraphs 195–198.

(⁴) Report of Interdepartmental Committee on the Demand for Agricultural Graduates 1964. Cmnd. 2419:—

"Higher technological training

76. Plans for other higher technological education in agriculture and horticulture, possibly at colleges of advanced technology, are also relevant to our inquiry. We have already touched upon the large number of centres of higher agricultural education in the United Kingdom. We have no doubt that if this higher technological education is provided, it will require opportunities for research in its support. This research work will be complementary to that in the universities offering agricultural and horticultural education. We emphasise the importance of avoiding the proliferation of centres providing higher technological education and the value of concentrating resources of men, money and equipment."

(⁵) Report of the Interdepartmental Committee on the Demand for Agricultural Graduates, 1964. Cmnd. 2419:—

"Diploma Courses

75. It is not within our terms of reference to consider the purpose and character of diploma courses in agricultural colleges. Nevertheless, these do impinge directly on our thesis that agriculture needs increased training at all levels of the industry. There may be an excellent case for one or more of the agricultural colleges to press on to a technological course of degree or near-degree status and to demand the necessary standards of entry, though it is important that it should be recognised that, if such upgrading of

problems of commercial production. We have already recorded the continuing demand(6) for diploma holders in these occupations and the interest of some employers in courses of this type but of a higher academic level.(7) It is known that the universities have been concerning themselves less and less with empirical aspects of husbandry in the courses which they offer, and agricultural establishments can make a valuable contribution in this sphere, especially if they use to the full their flexibility to provide the variety required both for new entrants and for experienced personnel.

Post-Diploma Courses

71. Post-diploma (or post-graduate) courses are eminently suitable for specialist aspects of production which involve new and advanced techniques. They may be of two kinds:

(*a*) Courses dealing with particular branches of agriculture or horticulture for which appropriate practical experience after the basic course would be desirable, although attendance immediately following a basic course need not be ruled out for those with suitable previous experience.

(*b*) Courses in farm organisation and management, which should normally be provided for those who have held positions of responsibility in the industry after completing their basic courses.(8) Post-diploma courses in Farm Management have been offered for some years by the Essex Institute of Agriculture and Seale Hayne Agricultural College.(9)

Provision of post-diploma courses is likely to play a part in meeting the needs of other ancillary occupations. The duration of these courses can be suited to their subject matters; they need not occupy a full academic year. National certification could be secured through endorsement of Higher National Diplomas, or, for management courses, possibly through the Diploma in Management Studies.

---

diploma courses does take place, the resulting diplomates are well able to play a competent role in teaching and advisory work. But we would deprecate the general adoption of such an objective and the dissipation of the limited funds available for research at the level which such teaching would demand, except where, as in Scotland, the research work benefits from the influence of an associated university. We see for the agricultural colleges the all-important long-term role of training the majority of the managers of the larger farms in Britain; we find it difficult to reconcile this key function with the prospect that admission standards and lengths of course may climb inexorably beyond what is attainable by the run of boys of average ability who are, nevertheless, of excellent farm management potential. We would have found it helpful if the farming industry had been able to give more precise definitions of what it needs at this level of training."

(6) Paragraph 37.

(7) Paragraph 63.

(8) See also Appendix B on Management Education in Agriculture.

(9) The enrolments were 6 and 22 respectively in 1964–65.

Supplementary Courses

72. Supplementary courses of the current type should continue as long as they are necessary for students who are not initially prepared or qualified to enter two year courses but who attain a satisfactory standard in certificate courses. We refer to an examination qualification for students who complete supplementary courses in paragraph 171.

Part-time Courses

73. As a result of the preceding proposals, there may possibly be a need for the introduction of new part-time *General ("G") courses* and of Ordinary National Certificate type courses. The "G" courses would be similar to those which are now provided for young entrants to other industries who have few or no passes in the General Certificate of Education but whose school record suggests that they have the ability, with further preparation, to profit from the Ordinary National Diploma courses proposed. The curriculum would make use in an elementary way of the applications of science to agriculture and the principles underlying stockmanship and other farm craft skills. Careful planning would clearly be needed to ensure that these courses were co-ordinated with the subsequent courses to which students would progress. Students reaching the required standard at the end of the "G" course would then be able to proceed to the full-time Ordinary National Diploma course. As in other industries there would need to be other suitable outlets for students from the "G" course. One such outlet would be the one-year full-time certificate courses which already exist and another might be part-time Technician ("T") courses. The academic standard for entry to the Technician ("T") type courses would not be as high as for the Ordinary National Certificate and Ordinary National Diploma type courses but it would have strong scientific bias directed to the appropriate applications in agricultural production or in the ancillary industries. Technical colleges which have access to adequate practical facilities should be able to provide these courses.

74. *Ordinary National Certificate type courses* would provide a further outlet for students from "G" courses and would be open to students with four or more passes at the "O" level of the General Certificate of Education. Although we would agree that, generally, pupils are best advised to remain at school to obtain the qualifications in science which are needed for advanced courses of further education, our evidence suggests that there is a need for a further education route to advanced agricultural courses. We would regard the principal purpose of Ordinary National Certificate type courses for agricultural students as being to provide them with the basic science necessary for advanced courses. Those who aspire to higher courses and who show suitable promise should be recommended to take this rather than to enter agricultural certificate or Ordinary National Diploma courses, which are intended for skilled craftsmen and technicians. Technical colleges which offer courses leading to the Ordinary National Certificate in Sciences, with the biological option, should be able to provide suitable courses of this type. Indeed, the Ordinary National Certificate in Sciences, possibly with some modifications, might be a suitable qualification; and this development could lead in time to the need for an Ordinary National Certificate in Agriculture or in Horticulture. Students who intend to proceed to full-time

courses in horticulture as well as agriculture should be admitted but in some areas where, even so, students are few, tutorial methods of teaching might have to be used, supplemented by short periods at an educational establishment for groups of students. Elsewhere an adequate number of students might be assembled for block release if not for part-time courses.

Part-time and Block Release Courses

75. We have referred to part-time day courses as a means of preparing for the full-time education with which this report is principally concerned. We suggest that much could be gained by releasing part-time students for longer periods of study at appropriate stages. Block periods of a few weeks at an educational establishment which has a farm, with its facilities for demonstrating the application of principles, would enrich their courses. Conversely younger students on block release courses would benefit from the maintenance of educational contacts during the intervals between the continuous weeks of attendance.

Short Courses

76. We have recorded (1) that we believe there is a big latent demand for courses for mature persons with some years of experience who wish to improve their knowledge, keep abreast of developments in husbandry and business management or study new techniques. Most of these courses will have to be concentrated. Possible arrangements are short periods in residence at an educational establishment which has a farm; a series of consecutive days at an extra-mural centre or intensive part-time day attendance. In the latter cases the work may be associated with a local farm which could provide the facilities required. It has also been suggested that courses might be conducted at a farm for the employees of that and neighbouring farms.

The Maintenance of Older Students

77. For some purposes, such as the study of farm organisation and management, it is desirable that students should have acquired practical experience in responsible posts after completing their basic courses. By that time they are likely to be earning more than the usual local education authority grants. Older persons from other industries who return for full-time courses usually do so on full pay. In agriculture a person returning for a supplementary or post-diploma course, unless he is the son of a farmer, is likely to be doing so with the intention of taking a more responsible post subsequently. We hope that the proposed Industrial Training Board will consider making financial arrangements to encourage further study by such key personnel.

Experimental Work

78. With teaching farms available, husbandry investigation should form part of the work of all the agricultural establishments. The quality of teaching will be enhanced if some members of staff, particularly those involved in the more advanced courses, have opportunities to participate in systematic experimental projects on husbandry problems, and we would expect them to be organised so that the results could be used for teaching purposes.

---

(1) Paragraphs 27 (*d*) and 36.

Chapter 5. SPECIAL BRANCHES AND ALLIED TECHNOLOGIES

79. The preceding chapters apply to general agriculture and, for the most part, to the whole of agricultural education. Courses in general agriculture account for three-quarters of the men students in diploma and supplementary courses (978 in 1964–65), although for only 6 per cent. of the women (13). Other courses in particular branches of agriculture and in allied technologies have fewer students. Table 6 shows the enrolments in diploma and supplementary courses other than those in general agriculture 1964–65.

Table 6

Enrolments in Diploma and Supplementary Courses, other than those in General Agriculture

	Men	*Women*	*Total*
Agricultural Engineering(1)	43	—	43
Dairying(2)	22	144	166
Estate Management	205	—	205
Horticulture	92	59	151
Poultry	74	21	95

This chapter deals with the special features of these branches of agricultural education.

AGRICULTURAL ENGINEERING

Occupations

80. Mechanisation calls for increasing engineering knowledge on the farm or holding in the choice of machinery and equipment, in its care and operation and in the recognition of the need for repairs and overhauls. On large farms, equipped for the purpose, repairs may be undertaken on the spot rather than at repair depots.

81. Farm and horticultural mechanisation is continually being extended and requires the services of agricultural engineers who are now being produced in three ways: by training persons whose initial qualifications are in agriculture, by training persons whose initial qualifications are in engineering, and by providing initial training in agricultural engineering.

82. Those whose initial training is in agriculture and who are familiar with the use of machinery and equipment in mechanised production are required as advisers, salesmen and managers of mechanised farms and for

---

(1) National Diploma in Agricultural Engineering course at the Essex Institute of Agriculture and supplementary courses only. The table does not include 48 students in Ordinary National Diploma courses in agricultural engineering (see paragraph 86) nor students from England and Wales who are studying for the National Diploma at the West of Scotland Agricultural College. Twenty-eight candidates entered for the examination from this College and elsewhere (not counting the Essex students) in 1964.

(2) Not including students on the National Diploma course at the University College of Wales, Aberystwyth.

experimental work on mechanisation. It is essential for them to be able to argue the case for or against a particular piece of machinery or equipment in a particular farming situation. Engineering information alone is insufficient. The agricultural engineer trained as an agricultural technologist can also point the way to the mechanisation of production techniques, which hitherto may have depended entirely upon manual operations, and to improvements of existing mechanical techniques.

83. The person concerned with the design, production, or repair of agricultural machinery and equipment requires education and training as an agricultural engineer normally based on a knowledge of engineering rather than of agriculture.

84. Much of the work of agricultural engineers has its applications in horticulture, which in addition has problems of mechanisation associated with intensive production and with the control of micro-climates, involving electronic equipment and automation. These aspects of engineering are also important in specialised branches of agriculture, such as pig husbandry and poultry husbandry, and will become increasingly so as livestock production becomes more intensive.

Education

85. Farm mechanisation as an aspect of modern husbandry must clearly form part of general courses in agriculture. It will be essential that courses dealing with special branches of husbandry should pay heed to the greater mechanisation which is likely to be applied in large specialised enterprises. A special one-year full-time course in farm mechanisation at basic level is currently approved at one establishment(1). There is a supplementary course in farm mechanisation(2) and also a course in horticultural mechanisation(3).

86. Full-time courses for agricultural mechanics and agricultural engineering technicians are available at several establishments. One has a one-year course covering the requirements of a mechanic in a farm machinery depot or on a large mechanised farm, and a second year course for technicians(4). Another offers a one-year course for mechanics and a two-year course leading to an Ordinary National Diploma in Engineering and including some work in agricultural engineering(5). A third also offers a similar Ordinary National Diploma course (6). An independent establishment has a two-and-a-half-year full-time course leading successively to the mechanics' and technicians' qualifications(7).

87. The Essex Institute of Agriculture has for some time been offering a one-year full-time course in Farm Mechanisation, through which holders of the National Diploma in Agriculture or a degree in agriculture can qualify for the National Diploma in Agricultural Engineering. On the average about fifteen students have been attending this course. At the request of manufacturers and dealers, and in consultation with the Examination Board in

---

(1) Lincolnshire (Kesteven) Farm Institute (11 students in 1964–65).
(2) Lincolnshire (Lindsey) Farm Institute (8 students).
(3) Celyn Horticultural Institute, Flintshire (3 students).
(4) Lackham School of Agriculture, Wiltshire (18 and 11 students respectively).
(5) Rycotewood College, Oxfordshire (43 and 28 students respectively).
(6) Chippenham College of Further Education (20 students).
(7) Chelsea College of Aeronautical and Automobile Engineering.

Agricultural Engineering, the Institute has introduced an additional course leading to the National Diploma in Agricultural Engineering, which admits students with an Ordinary National Certificate in Engineering or the City and Guilds of London Institute Agricultural Engineering Technicians' Certificate or Mechanical Engineering Technicians' Certificate, Part II. Under arrangements coming into force in 1966 there is provision for students who are taking the examination for the National Diploma to specialise in the optional subjects of field engineering, farm buildings and mechanisation, horticultural production and environmental control, and business studies.

88. The above provision implements the first two alternatives set out in paragraph 81. With the increase in mechanisation, there is likely to be a growing demand for the third alternative, an initial integrated course in agricultural engineering. In conformity with the general pattern of courses which we have recommended, the institution of an Ordinary National Diploma type course in agricultural engineering deserves serious consideration. As a sandwich course practical experience could be obtained both in mechanised agriculture and in the agricultural engineering industry. Options could be available in the final stages of the course and the amount of time spent in obtaining agricultural or engineering experience could be varied accordingly. In addition to the advantage of an integrated study of agricultural engineering from the start, such a course would lead to a qualification appropriate to full-time study. A feature of the full-time courses listed in paragraphs 85 and 86, other than the Ordinary National Diploma courses, is that they seek national certification through examinations which have been devised for part-time courses. We hope that it will be possible to secure a more appropriate certification for the whole of the work covered by each course by means of the examinations machinery which we propose in Chapter 7. We believe that the co-operation of the Institution of Agricultural Engineers can be relied upon to this end. At higher levels the National College of Agricultural Engineering offers a three-year integrated course at first degree level leading to a College Associateship, and one-year post-graduate courses.

DAIRYING

Occupations

89. Four principal occupations in addition to teaching, which require full-time courses, are involved in the production, distribution and processing of milk. They are dairy farming, advisory services, plant operation and management, and laboratory control.

Dairy farming

90. Dairy farmers require a knowledge of general agriculture, including crop production, and most students who take up dairy farming have, in fact, followed courses in general agriculture. The contribution made by special dairying courses to the supply of milk producers is numerically small. Of the twelve men who completed courses leading to the National Diploma in Dairying in England in 1963 only three are known to have entered practical farming, as workers. Eight of the 39 women who completed these courses in England took up practical farming, seven of them as workers.

Advisory Services

91. Advice is given to dairy farmers by the Ministry of Agriculture, Fisheries and Food (the National Agricultural Advisory Service and the Milk Service), the Milk Marketing Board and by manufacturers and suppliers of feeding stuffs and equipment. The advisers require a sound knowledge of practical dairy farming together with a good grounding in dairy science. Recruits to the National Agricultural Advisory Service must have a degree in agriculture or they must possess the National Diploma in Agriculture and have completed a post-diploma course in farm management. The Milk Marketing Board and the manufacturers and suppliers also look for husbandry qualifications in appointing staff to their advisory posts. Milk Service officers, who are concerned with milk hygiene on the farm, must have a degree or National Diploma in Agriculture together with a qualification in dairying; a degree in Rural Science with dairying as a final subject; or a National Diploma in Dairying.

92. Over the five years 1960-1964 the Ministry of Agriculture, Fisheries and Food and the Milk Marketing Board recruited an average of 14 holders of the National Diploma in Dairying each year, and the manufacturers and suppliers who replied to our enquiry recruited approximately ten a year.

Milk Processing and Distribution : Plant Operation and Management

93. Persons taking charge of creameries and large milk plants require a sound knowledge of the dairy sciences, dairy technology, the principles of engineering, accounts, economics and business organisation and management applicable to the industry. They need a sufficient introduction to those aspects of husbandry which affect the quality of milk to be able to understand the farmer's problems, especially when they operate in rural areas where contacts between farmer and creamery are close. They are, however, not expected to perform the functions of advisory officers.

Milk Processing and Distribution : Laboratory Control

94. Laboratory control is exercised in a variety of places, from collecting depot to main distributing centre, in creameries and milk service laboratories. The staff require a course which starts from a sound initial basis of science, especially chemistry, and includes dairy sciences, dairy technology and accounts. The courses should lay a sound foundation for the interpretation of tests. Some knowledge of husbandry is desirable to make students familiar with relevant factors such as the effect of seasonal variations on milk quality. The majority of the present recruits to these laboratory posts are women. A broad scientific course, in addition to providing what the dairy industry requires, will facilitate their return later in life to work in other laboratories or other branches of the food industry.

95. Representatives of the milk processing and distributive industry have informed us that they are not obtaining sufficient recruits with the qualifications they need from current courses. In particular there is a shortage of men qualified to take responsible posts in creameries. The evidence we have received from employers and from educational establishments shows that a few men and about a dozen women who complete diploma courses

in dairying each year take up employment in milk processing and distribution. They represent about one quarter of the students who complete these courses. The Joint Committee of the Milk Marketing Board and the Central Milk Distributive Committee has assured us that the industry could absorb fifty recruits a year who were suitably qualified at the diploma level.

Education

96. Current courses leading to the National Diploma in Dairying recruit students who proceed to all the above-mentioned occupations. Candidates are required to have spent nine months working on a dairy farm and two months in a creamery or processing dairy. The syllabus of the examination has been modified from time to time in an effort to meet the requirements of all the occupations concerned. These have now become so diverse and specialised that, in our view, they require separate consideration and appropriate courses.

Dairy farming

97. The most suitable educational preparation for dairy farmers is a general course in agriculture. This might be a certificate course or a course of Ordinary National Diploma, Higher National Diploma or degree type. A more comprehensive study of milk production could be provided, if required, in supplementary or post-diploma courses.

Advisory Services

98. In courses outside universities, Higher National Diploma or degree type courses in general agriculture, which we have recommended as preparation for dairy farming, carried to a suitable level in post-diploma courses as necessary, will afford appropriate preparation for husbandry advisory work. Those who are to advise on milk hygiene will require to have carried their study of the dairy sciences to sufficient depth, and one centre for this should suffice to meet requirements of the order recorded in paragraph 92. It would probably be most economical to cater for it at the establishment which makes the advanced provision for the distributive and processing industry.

Plant Operation and Management, and Laboratory Control

99. Milk processing and distribution requires courses designed to meet its particular needs. Both the content and the practical experience which is required differ from those needed for dairy husbandry. Experience on a farm is not essential for admission to a course in milk technology, although some farm experience before its completion would be useful.

100. A period of training in creameries and processing plants is essential. There is much to be said for its following an introduction to the dairy sciences at the educational establishment, so that students have an appreciation of the principles which need to be applied in dealing with milk and dairy plant. We recommend that any new course which is introduced for this industry should start by integrating training in creameries and other

plants with the work at the educational establishment on a sandwich basis. Experience on full-scale plant will then be obtained during training periods and the educational establishment will require only a modest-sized plant as well as suitable laboratory equipment and an adequate range of staff. The industry already has experience of a successful sandwich course at technician level(¹).

101. We are satisfied from the evidence received that milk distribution, processing and manufacturing requires courses broadly at the two levels:

(*a*) A course at Ordinary National Diploma level would provide a supply of technicians. It remains for consideration what the relation should be between this and the sandwich course already mentioned and also whether provision should be made for both plant technicians and laboratory technicians in the establishment which provides an Ordinary National Diploma type course.

(*b*) An advanced course recruiting students with passes in the Advanced level of the G.C.E. or with an Ordinary National Certificate in Science is also necessary. It could allow for differentiation in the later stages to cover the needs of plant operation and management and laboratory control respectively. It seems likely that at first the Higher National Diploma level rather than the degree level would be attained, but in either case this type of provision would be assisted if the industry were able to guarantee a flow of recruits on a sandwich basis as proposed above. We share the view of the Joint Committee that the facilities for an advanced course should be provided initially at one centre only on a scale sufficient to enable the course to be run efficiently. The Joint Committee has expressed a preference for the course to be provided at an agricultural establishment, which would be able to give suitable instruction in those aspects of husbandry which are relevant and also to demonstrate them in practice. We agree that, although it is not essential, this would be highly desirable. Such a centre would also be able to provide the post-diploma course required for intending Milk Service Officers(²). The relevance of such provision to other branches of food technology will need to be explored.

102. The principle of progression should be applied: that is, there should be facilities for those who enter milk processing and distribution in the lower grades to fit themselves through further education for admission to diploma courses. The industry has started to release young entrants for block release courses. The extension of this type of arrangement to diploma courses would provide an avenue of advancement to the highest posts for those who had the ability to proceed along it.

(¹) The Cheshire School of Agriculture, Reaseheath, in 1964–65 had 25 students in a sandwich course which is attended for two winter sessions, October to March, by creamery employees. No educational requirements are specified, but more than half of the students had four or more passes at the Ordinary level of the General Certificate of Education or Stage I or II qualifications gained by attendance at part-time courses; only five were without any qualifications.

(²) See paragraph 98.

ESTATE MANAGEMENT (RURAL)

Occupations

103. Rural estates are seldom managed by their owners without professional help. More frequently owners, including public authorities and industrial and commercial companies, employ professionally qualified staff either full-time or part-time. The owners of larger estates usually employ either a full-time resident agent or a firm of land agents in private practice, in which case it is usual for one of the partners to be responsible to the owner for the general management, while he may employ a resident agent to deal with day to day matters.

104. Most of the agents managing the larger rural estates are professionally qualified members of the Royal Institution of Chartered Surveyors, the Chartered Land Agents' Society or to a lesser extent the Chartered Auctioneers' and Estate Agents' Institute. For efficient management an owner or his agent must have a thorough knowledge of farming and forestry as well as business management, accountancy and taxation. These subjects are covered by the syllabuses of the three chartered bodies, as are building layout, construction and maintenance, agricultural law, valuations, etc.

105. While the Royal Institution of Chartered Surveyors has agricultural surveyors among its members in the agriculture and land agency section, candidates also sit for examinations in urban, quantity, mining or land surveying. Similarly the Chartered Auctioneers' and Estate Agents' Institute has a distinct rural section. The Chartered Land Agents' Society, on the other hand, confines itself to rural estate management. Candidates for membership who have been awarded recent degrees in estate management at Cambridge or London Universities as well as students awarded diplomas in estate management at the Royal Agricultural College, Cirencester, are exempted from certain parts of these examinations.

Education

106. The rural section is one of the smallest covered by the professional institutions. Between one and two hundred candidates in England and Wales qualify through passing the final examinations each year. Most candidates for membership of the institutions enter an office on leaving school and study part-time for their examinations. The proportion who pass, often less than one half, suggests that they would be helped by attendance at courses, but we have not received any indication of a shortage of places for full-time students.

107. The majority of full-time students on the rural side attend courses at the College of Estate Management in London or at the Royal Agricultural College, Cirencester. Those on degree courses at the former are admitted to the internal examination of the University of London. The Royal Agricultural College had an entry of 86 men to its rural estate management course in 1964/5, and a total of 205 studying this subject. At the end of their second year successful students obtained a College Diploma in Estate Management. Those who achieve a 1st or 2nd Class result may continue for two terms

and take the Final (written) Examinations of the Chartered Land Agents' Society and of the Royal Institution of Chartered Surveyors. Passes in both give exemption from the Final Examination of the Chartered Auctioneers' and Estate Agents' Institute.

108. From October 1966 the Royal Institution of Chartered Surveyors will require candidates to have passed two subjects at Advanced level and three at Ordinary level of the General Certificate of Education, or three at Advanced level and one at Ordinary level. We understand that the other two Institutions are likely to raise the standards for admission to their examinations similarly.

109. The Institutions have stated that they encourage the tendency of colleges to offer their own internal diploma examinations or to seek a degree award from the Council for National Academic Awards, which will carry appropriate exemptions from the professional examinations. We welcome the willingness of the Institutions to grant this exemption from their external examinations and trust that they will agree on common standards to be attained and on the college examinations which carry exemption.

HORTICULTURE

110. We have found that the problems which existed in agricultural education generally were also those which required solution in horticultural education. Those who gave evidence based on their experience of horticultural employment and horticultural education raised the same types of issue as others were raising in other branches of agricultural education. We have reached the conclusion that it is neither necessary nor desirable to adopt any principles with respect to horticultural education which are not equally applicable to the other branches. Indeed, their relevance to the situation in horticultural education has been one of the factors which has convinced us of their general validity. All that we propose in our general chapters on the major problems of education and training, course organisation and examinations, applies to horticultural education; and the present section needs to be read in the context of our report as a whole.

111. We agree, however, with those who have pointed out that many of the problems with which we have been dealing appear in a particularly vivid light in horticulture and that ways must be found to evolve solutions which will be acceptable both to employers and to students. In this chapter we concentrate on the application of our general principles and proposals to the special circumstances of horticultural employment and horticultural education.

Occupations

Commercial Horticulture

112. A fair proportion of agricultural holdings produce horticultural crops in the sense that they grow apples, potatoes, cabbages, etc. on an extensive scale as part of their general farming operations. Large scale production of what were at one time regarded as market garden crops may be expected

to spread with mechanisation and it would be futile to draw a hard and fast distinction between agriculture in the narrower sense and horticulture in planning educational provision.

113. Commercial horticulture includes market gardening, glasshouse production and other forms of protected cultivation, fruit growing and nursery work. Individual businesses tend to concentrate on a very limited range of crops. This specialisation, which is already more pronounced than in general agriculture, is being carried to increasingly greater lengths, and is making it progressively more difficult for students to obtain a broad type of experience whilst working on well-run commercial holdings. Specialisation by region is another factor which affects the possibilities of obtaining practical experience, and that has to be taken into account in deciding on the location of educational courses.

114. In 1964 25,000 commercial horticultural holdings were capable of supporting at least one grower or full-time worker(¹). These constitute 16 per cent of the 160,000 "full-time" holdings shown in Table 1, and the replacement of the occupiers at the rate calculated in paragraph 30 would be about 900 a year. The Ministry of Agriculture, Fisheries and Food assesses the total number of growers and workers engaged in commercial horticulture, but not necessarily whole-time, as being of the order of 85,000, including the occupiers of the 25,000 holdings mentioned above. They constitute about 11 per cent. of the total of persons obtaining a livelihood from agricultural production in England and Wales. Allowing on the one hand for part-time growers and workers included in the 85,000 and on the other for the higher proportion of holdings to the total numbers engaged, and thus of principals, we may assume that some 1,500 of the 10,000 young persons entering on an agricultural career(²) are likely to find their livelihood in commercial horticulture.

Amenity horticulture

115. There is a wide field of employment in botanic gardens and in many types of amenity horticulture such as public parks, recreation grounds, roadside planting and the grounds of public and private organisations. The number of workers engaged in horticulture in public parks and recreation grounds has been assessed at about 50,000. On a permanent career basis these might require replacement of the same order of magnitude as in commercial horticulture. The Institute of Park and Recreation Administration has, however, given us an estimate of over 70,000 employed in horticulture and ancillary work in local authority service with a wastage of, say, 10 per cent and a need for 6,000 recruits each year who require training. The Institute estimates that about 300 require training at field supervisor or foreman level each year and about 20 as park administrators(³).

(¹) Ministry of Agriculture, Fisheries and Food estimate.

(²) As calculated in paragraph 31.

(³) The Committee is indebted to the Association of Municipal Corporations for undertaking a sample survey of 21 county boroughs and 15 non-county boroughs, which together account for about one-third of the population in boroughs. They reported the employment of 32 holders of the National Diploma in Horticulture, of whom 17 have been appointed in the past five years.

The Maintenance of Playing Surfaces

116. Park staff are responsible for the maintenance of school playing surfaces in many boroughs, but in county areas a separate organisation usually exists. The extensive nature of the operations on large playing fields and the scale of a county-wide organisation justify the placing of much of this work in a special category. Staff are not so much involved in ornamental horticulture, although it is desirable that they should be able to undertake this. The effective creation and maintenance of these surfaces is a major task requiring skill and supervision and management by trained personnel. There are about 30,000 schools and other educational establishments, not counting infant schools, and the area of playing surfaces is being increased year by year.

Advisory Services

117. Advice is given to commercial growers by the Ministry of Agriculture, Fisheries and Food and by the manufacturers of fertilisers, chemical products and other supplies. In addition local education authorities have the responsibility of advising domestic producers, mainly through the staffs of county agricultural and horticultural institutes or through horticultural advisers.

Posts taken by students

118. 52 of the 97 students who completed supplementary and two year courses in horticulture in 1963 entered commercial horticulture. Seven took employment in parks and gardens and a few went into ancillary industries and advisory services. Six became teachers. The information we received showed that almost all the fully qualified holders of the National Diploma in Horticulutre were in public employment in the Ministry of Agriculture, Fisheries and Food (122), the Agricultural Research Council (10), the local authority teaching service (26) and in the sample of about one-third of the municipal parks (32). Only trifling numbers were scattered through the industrial and commercial organisations which supplied returns.

Craft and Technology

119. Both in employment and in training craft skill figures prominently in horticulture. Despite an increasing degree of mechanisation there still remains much hand work; and a variety of crafts must be studied by the advanced student as well as by the person who is training to be a skilled worker.

120. There has been a tendency for diploma holders to qualify in general horticulture rather than in the specialised branches. Commercial growers are, however, in a highly competitive industry and the trends towards the development of new techniques based on the application of science, towards intensive and specialised enterprises, and towards improved commercial and marketing organisation are proceeding at a dramatic pace. The student needs to understand the principles underlying production techniques and the commercial reasons for business decisions. It is the task of education to help him to achieve this. The respective roles of in-service training and of education need to be recognised so that the teaching establishments can make their distinctive contribution to training and education as a whole.

The Current Situation

121. The growing interest in vocational education on the part of those working in horticulture is shown by the number of candidates entering for the Stage I examinations of the City and Guilds of London Institute and certain Regional Examining Unions, which are taken by young persons at the end of a part-time course, normally of two years duration. For example, although the Institute introduced its examinations in horticulture as recently as 1963, the number of entries in 1965 ranged from 570 to 724 for each single subject, which was about half the number of those who entered for each subject in the Stage I examinations in General Agriculture, which were introduced in 1960.

122. One year courses leading to the National Certificate in Horticulture are offered by eight county institutes and attended by about 200 students. Three of these institutes offer together six one-year supplementary courses in various branches of commercial horticulture, with a total annual intake of about 60 students, and one started a supplementary course in recreational and decorative horticulture in 1964/65. The National Certificate in Horticulture can be endorsed after the successful completion of a supplementary course. In the examinations at the end of both basic and supplementary courses some questions are set by the institute and some externally by the Royal Horticultural Society, which awards the certificates. Some sandwich courses in horticulture have recently been introduced(1). Approximately 100 students attend two year courses.

123. Higher technician and technological levels of horticultural education outside universities are at present handicapped because the recognised qualification, the National Diploma in Horticulture, requires examination candidates to have had six years of practical experience in horticulture, only two of which can be spent as a student in full-time education. Candidates who attend full-time courses in preparation for the Diploma usually intend to take the Intermediate examination, but to do so they must have had four years experience (which may include the time spent on the course). Students admitted to the course at the Pershore Institute of Horticulture and many of those at the Essex Institute of Agriculture are in a position to enter for this examination on the completion of their courses. Further preparation for the Final examination is undertaken by private or part-time study. The examination, however, has its traditions in the past, when horticultural education facilities were primitive, and private study was, indeed, the only route open to the ambitious student. With the rapid increase in knowledge and experience, it is clearly becoming more and more difficult to reach this level without both adequate science background and formal training in the principles and practice of horticulture. The response to some short courses which have been offered in recent years by Studley College for students preparing for Intermediate or Final examinations indicates the interest which exists in organised educational preparation for these examinations. We understand that the Royal Horticultural Society is currently reviewing its Diploma examinations.

---

(1) See paragraph 53.

Proposals

124. We consider a reorganisation of the diploma type of horticultural education to be necessary. There should be courses leading to a definite qualification at about the present Intermediate level and a course at a higher level through which students will be able to make a more thorough study of technological principles than they can at present while engaged in full-time employment. At the same time the problem of securing suitable practical experience must be solved. If this is integrated with the educational provision the student should be able to obtain a better training in less time than he is now required to spend in employment in order to enter for the National Diploma in Horticulture examinations.

125. Horticultural students need a broad general introduction to their subject followed by the opportunity to specialise. The Ordinary National Certificate type of course which we have recommended would prepare students for higher courses in both horticulture and agriculture. The current arrangements for a full-time one year general certificate course, from which students who achieve the credit level may later take a specialised supplementary course, should continue as long as necessary(¹). Our general proposal for three year sandwich Ordinary National Diploma type courses admitting students with four Ordinary level passes in the General Certificate of Education or with a suitable level of performance in a preparatory " General " further education course will also be applicable. These courses can offer students a choice of special subjects in the later stages and will constitute definitive provision at about the level of the present Intermediate examination of the National Diploma in Horticulture. A Higher National Diploma type course, recruiting students with at least one pass in a specified science at the Advanced level of the General Certificate of Education, or with an Ordinary National Certificate or an Ordinary National Diploma, would be a valuable addition to the educational provision. It would allow time for the adequate treatment of the principles underlying new and developing techniques and of business methods and marketing, and should help to fill the gap in the range of courses which are now offered. The needs of public employment would also have to be considered. It will clearly be desirable to test the demand for one course initially, since the enrolments recorded in paragraph 122 do not point to large numbers higher up the pyramid.

126. The principles set out in the Chapter on Education and Training have a most direct application in horticulture. Young entrants need the best training that can be given at their places of work, whether these be commercial enterprises, parks, playing fields or other public or private grounds ; or in botanic gardens and other specialised institutions. The training needs to be integrated with the diploma courses of the educational establishments. The way in which industry has already become involved in the educational provision, where sandwich arrangements have been introduced into horticulture(²), encourages us to recommend that all diploma type courses in this subject should be organised on a sandwich basis.

(¹) See paragraph 72.

(²) See paragraph 53.

127. We should like to add a special plea for closer association between the educational establishments and various specialised institutions. Botanic and other gardens offer to student gardeners and other young employees a valuable, broad but non-commercial training in the growing of plants and this is the means through which many obtain or supplement their qualifications in horticulture. All these trainees would benefit from attendance at an educational establishment at appropriate stages. Conversely other students would benefit from obtaining part of their practical experience in such institutions. The sandwich courses we propose make both these arrangements possible. The young person can be based on his place of employment or training (an industry-based sandwich student) or he can initially join the educational establishment and find suitable employment for his practical periods (a college-based sandwich student). At least one research station provides organised instruction for trainees and we would welcome the extension to research, experimental and similar stations of the arrangements we are recommending. We recognise that training costs money and we hope that the establishment of an Industrial Training Board will lead to the introduction of financial arrangements which will facilitate the full use of the potentialities for training which are available in specialised institutions as well as in commercial horticulture.

128. Our general recommendations in paragraphs 71 and 76 for the development of post-diploma courses and short courses are relevant to the need to cater for the highly specialised requirements of commercial and public employment in horticulture, especially for persons occupying responsible posts.

POULTRY HUSBANDRY

Occupations

129. Specialisation has been developing in the poultry industry for over a generation and has now reach great intensity. Specialised courses have become established at both certificate and diploma levels(1) and personnel thus qualified are entering the industry. In 1963 and 1964 about one third of the three dozen students who completed the two year diploma course took up practical farming. We have been assured that there is a firm demand for technically trained people and that the industry would like to see more students coming forward for employment.

130. Public and private advisory work is another important field of employment, also claiming about one third of the diploma students. A smaller proportion took employment with manufacturers of feeding stuffs.

131. The fact that diploma holders are readily able to find posts in production and ancillary occupations is indicative of the value of the education which they have received. Courses will have to keep pace with the needs of an industry which now includes highly specialised enterprises, some of great size and complexity. Specialisation has meant not only the separation of much of poultry production from the rest of agriculture, but also internal differentiation between hatching, breeding, egg production and table poultry

---

(1) See paragraph 134.

production, and a complex marketing network. The industry requires, in addition to skilled workers, technicians competent to take charge of productive enterprises which represent a heavy capital outlay, and technologists capable of solving the problems which are inherent in large scale and intensive methods of production.

132. The technician must be capable of supervising the work of skilled stockmen and of understanding and dealing with the day-to-day problems of highly organised enterprises. He needs a sound education which is based on the crafts and enables him to understand the reasons underlying the techniques in use.

133. Technological services are required to deal with the problems of large-scale production. Graduates, with post-graduate specialised training, are needed for much of this, but there is also a sphere for the person whose approach is not from the point of view of the individual sciences but who has a sufficiently broad scientific knowledge to be able to apply the findings of research to the problems of production.

Education

Current Provision

134. Poultry education has already evolved a pattern of full-time courses in association with a National Poultry Diploma Board which is widely representative of the industry and of teaching establishments and examines students for full-time courses at all levels. There are four courses of one year's duration leading to the National Certificate in Poultry Practice, with a total of about 70 full-time students. A three year sandwich course has recently been introduced at the Lincolnshire (Kesteven) Institute. The two year course leading to the National Diploma in Poultry Husbandry recruits about three dozen students annually. It requires candidates to have a minimum of passes in four subjects at the Ordinary level of the General Certificate of Education, but in 1963/64 60 per cent of the students had six or more such passes and some had passes at the Advanced level. A three year full-time course leading to the National Diploma in Poultry Technology started in 1962 and the recruitment to it has varied from year to year. It requires for admission two passes, in Chemistry and in Biology or Zoology, at the Advanced level and passes in four subjects, some specified, at the Ordinary level. The courses in England and Wales leading to the two Diplomas are concentrated at the Harper Adams Agricultural College, which incorporates the National Institute of Poultry Husbandry.

135. While the different levels of entry which have now been introduced into full-time poultry courses are in line with our recommendations, we feel that the time is ripe for a full review of this branch of education in accordance with the principles and course proposals set out in Chapter 4. It is necessary to ascertain in detail the requirements of the industry for both basic and specialised courses. Questions arise as to whether the industry is liable to lose more than it gains by relying on specialised educational courses for very young persons, and whether at this stage educational establishments should deal with general principles, which are applicable also in other branches of animal husbandry, leaving the industry to provide training in its specialised techniques. At the higher levels the need for courses for technicians and for

courses with a broader scientific basis should be determined. The entry levels should be related to the normal school leaving stages, so that the industry stands a reasonable chance of recruitment. Provision for the further education of those who have obtained experience in the industry is important. We believe that many firms will be prepared to second selected employees, who have already shown their worth, to attend courses which will help them to fill posts of higher responsibility. We recommend that discussions should be held between the industry and the educational authorities on all these matters. In the paragraphs which follow we refer to some issues which have been raised in the evidence submitted to us.

Sandwich Courses

136. We understand that there is some disquiet about the amount and nature of the practical experience which diploma students obtain before starting their course. We have heard it suggested that this problem would be solved if students were recruited from certificate courses, in which they have a good deal of supervised practice of the crafts. About 10 per cent of the recruits to poultry and other diploma courses come from certificate courses and we know, from an analysis of the records of all students who completed diploma courses in 1964 that they achieved very good results in the national diploma examinations. There are, however, both educational and financial issues involved.

137. Certificate courses are definitive educational courses in their own right and are intended as a preparation for the skilled worker or farmer. They have their own requirements of practical experience before admission. Our general proposals on courses imply that students who show the academic ability to proceed to the courses requiring a more scientific background should be enabled to do so, either when they leave school with the necessary qualifications or on the strength of their performance in a " General " preparatory and diagnostic further education course or an Ordinary National Certificate course. With these additional possibilities of further education which we have proposed for the more academic type of school leaver, we would not expect there to be a *route* from one year certificate courses to diploma courses. This does not preclude the admission to diploma courses of the individual who blossoms out exceptionally in a certificate course.

138. The practical work which students undertake in certificate courses is, or should be, the application in practice of the principles which are being taught. We have already recorded in Chapter 3 the principle that training is the responsibility of industry. Thus, local education authorities would not assume financial responsibility for taking students into residence for the purpose of providing the practical training which falls within the sphere of responsibility of the Industrial Training Board. We have, however, already stated in the note to paragraph 49 that this does not preclude the provision of training by a local education authority on payment by industry.

139. We recognise the immense importance of practical training for work which has become so intricate as poultry husbandry, and we know that a number of large producers have gone to considerable trouble to organise training for their employees, related to the particular requirements of their own enterprises. So long as each side shoulders its own responsibilities there

is much to be gained, here as elsewhere, from a joint approach by education authorities and employers planning education and training as a whole. We believe that the sandwich arrangements which we have recommended generally in Chapter 3 offer the right solution. These would enable the industry to send forward its most promising young persons for advanced education and facilitate the recruitment of others by the college in the knowledge that employers would co-operate in providing the opportunities for practical experience in modern enterprises.

Short Courses

140. The numerous divisions both of production and of ancillary occupations have special educational requirements for which provision has not hitherto been made on a sufficient scale. Much of the need is for *ad hoc* advanced courses, which may often be short, for persons who have received a general training and who are engaged in a specialised activity. We understand that there has recently been a very encouraging response to a short course for managers of egg packing stations, and that large-scale producers have expressed an interest in this type of provision at various levels for their employees.

Part-time Courses

141. The specialist provision of poultry education has remained, to an excessive extent, the preserve of the full-time courses. For an industry which depends so much on experience of intricate techniques we believe that the part-time education during the day of those in employment should play a bigger role. Part-time courses could be expected to foster the development of students who would subsequently be able to benefit from full-time education.

Chapter 6. WOMEN

Occupations

Production

142. The figures in Table 1(¹) giving the number of workers employed on agricultural, including commercial horticultural, holdings in 1964, show that women and girls constituted seven per cent of the whole-time labour force. They accounted for a much higher proportion of part-time and seasonal employees, but these are unlikely to make significant calls on the facilities for full-time technical education.

143. The evidence we received from the teaching establishments on women students leaving two-year courses in 1963 was as follows: eight out of 40 leaving dairying courses entered practical farming; ten out of 28 leaving horticulture courses entered commercial horticulture; four out of 13 leaving poultry courses entered practical farming.

144. Four of the 26 horticultural students (not necessarily with an Intermediate National Diploma qualification) left for work in parks and gardens. A sample survey(²) of municipal parks, which covered about one-third of the total, showed no women holders of horticultural diplomas.

145. We have received information on the wide range of appointments held by past horticultural and dairying students in commercial horticulture, parks and gardens, and dairy farming, as well as in scientific, teaching and advisory posts.

Ancillary Occupations

146. Women who have attended two-year diploma courses find more openings in ancillary occupations than in production(³). We have received the following information from employers:

Table 7

Women Diploma Holders in Ancillary Occupations

			Diploma Holders Employed 1964	
	Women	*Total*	*Women*	*Total*
Manufacturers and Suppliers			7	618
Processing, Marketing and Distribution				
Milk	84	249		
Egg and Chicken ...	25	48		
Other	—	72		
			109	369
Research (Agricultural Research Council) Advisory etc.			28	86
Ministry of Agriculture, Fisheries and Food			141*	800†
Teaching			100 (approx.)	400–500
Other			—	34
			385	2,307–2,407

* 104 N.D.D. or N.D.D.H. and 25 N.D.P.H.
† 179 N.D.D. or N.D.D.H. and 76 N.D.P.H.

(¹) Paragraph 9.
(²) See paragraph 115.
(³) Details are given in Appendix D.

147. The majority of women diploma-holders in these occupations are those with the National Diploma in Dairying. Holders of the National Diploma in Poultry Husbandry are the other large group. In these two spheres women account for a third or more of the diploma holders employed. In ancillary occupations generally the above figures show women as constituting 16 per cent of the diploma holders, twice the proportion that women account for in the total labour force in production.

148. If further specialisation differentiates more between production and ancillary occupations, and leads to a relative increase in the numbers employed in the latter, the comparison made in the preceding paragraph suggests that the proportion of women in occupations linked with agriculture might well hold its own, or even increase.

149. Judging from the current teaching establishment, the annual recruitment of women diploma holders to teaching in schools and further education is likely to be about ten(¹).

Education

150. Table 8 shows that 16 per cent of the total diploma students are women—the same proportion as they constitute among diploma holders in ancillary occupations. Dairying and Poultry Husbandry again account for the majority. Horticulture also shows nearly half women, although not all these are preparing to take the National Diploma (Intermediate) at the end of their course.

Table 8

Women Students in Diploma Courses

	Students 1964–65	
Diploma Courses		
Subject	*Women*	*Total*
Agriculture	11	870
Dairying	144	166
Estate Management	—	205
Horticulture	54	104
Poultry Husbandry	15	67
Poultry Technology	6	28
	230	1,440
Other Courses		
Post-Diploma	—	22
Supplementary	7	168

151. There are no facilities for women to study Estate Management at the Royal Agricultural College, but the courses at the College of Estate Management are open to them.

Secretarial courses

152. We expect the demand for secretarial services to show a large increase. This work is not confined to women and there is no reason to believe that it will become their exclusive preserve. Farm secretaries need:

(i) a good general education,

(ii) proficiency in typewriting, and possibly also in shorthand,

---

(¹) See paragraph 20 on the training of school teachers.

(iii) office experience, including the application of accounts to the farm, and

(iv) knowledge of the business of the farm, including the records.

The distinctive contribution of the agricultural college or institute is to provide the last ingredient and to help the student to obtain the third. The three full-time courses for farm secretaries which have been started in recent years use the facilities of other colleges of further education for teaching the office skills and commercial subjects. The alternative of recruiting students who have already acquired proficiency in typewriting, and possibly also in shorthand, during a general commercial course at school or at a college of further education, deserves consideration. This would enable students to apply their skill and knowledge in an agricultural setting from the start of their time at the agricultural establishment, and to use its facilities more effectively for studying agricultural subjects. On this basis a full academic year at the agricultural establishment would not be necessary; indeed, a better arrangement would probably be a sandwich course involving a college of further education, the agricultural secretarial agencies or approved farm businesses, and an agricultural education establishment. It has been put to us that there is room for a secretarial course admitting students who have already obtained an agricultural diploma. Undoubtedly such students would benefit from further study of accounts and recording, but we would expect this to be a stage in the progress of the technically qualified young person towards supervision and management rather than to secretarial posts.

Range of Courses open to Women

153. The evidence shows women occupying a variety of posts which are also open to men, especially in ancillary occupations. The emphasis of employers has been on the need for a sound educational foundation coupled with knowledge of specialisms. It is accordingly important that places in courses in all subjects, including specialised courses, should be available to women, rather than that women should be concentrated in courses of their own, which, with the number of students involved, cannot cover all their vocational needs.

Institutional Provision

154. It has been suggested to us that some parents and girls prefer a single sex college. While we do not doubt that this is so in some cases other evidence has given no indication that this is now a widely held view, and we do not regard it as justifying separate institutional provision in agricultural education. The desirability of having the full range of courses open to women is the overriding consideration in this area of vocational education, with its many specialised branches, but comparatively small total number of students.

Chapter 7. EXAMINATIONS

Principles

155. Examination arrangements have been a subject of great concern to many who have given evidence, especially to those involved in the provision of education. The discussion of this subject will be assisted if we establish basic principles ;

First Courses must fit the needs of industry and students ; and examinations should fit courses.

Second Teaching establishments should have freedom, within the context of the basic course content, to evolve their own teaching syllabuses and teaching methods.

Third Qualifications should have an assured national currency.

First Principle

156. We are dealing with vocational education. We have considered in Chapters 1 and 4 the need for courses to be suited to the requirements of the occupations served, to be related to the rest of the educational system and to form a sound educational pattern. Industry should define its needs, and the education service should plan the content of courses in the closest consultation with industry to meet these needs and those of students. Courses at different establishments, which have much in common and are at the same level will, nevertheless, often show variations in emphasis according to the regional and local patterns of agriculture and the demands of specialisms. In Chapter 8 we emphasise the desirability of courses being distributed and controlled as parts of a national system of agricultural education.

157. In this context of a national pattern of courses we urge that future policy should follow the dictum that examinations should spring from courses, not courses from examinations. Examinations obviously have a very direct influence on teaching syllabuses. There will be a general recognition of their role in promoting the development of agricultural education in the past. The examining bodies have set national standards, which have served as a guide to employers, students and teaching establishments. However, examinations can be constricting unless their syllabuses are kept up-to-date and develop with the needs of courses. Technological advance is causing, and will continue to cause, changes in the content of courses, which should be reflected promptly in examinations. This requires a flexible organisation through which the views of the industry and of teachers can be brought to bear directly on the examinations as well as on the initial planning of courses.

Second Principle

158. Teaching establishments have the responsibility for constructing teaching syllabuses and for deciding the appropriate teaching methods to adopt. In doing this they will be guided by the general content and purpose of the course, the needs of their particular students, and by the approach of the

teachers concerned to the subjects of the course. A distinction must be drawn between teaching syllabuses and the examination syllabuses which are issued by bodies which conduct external examinations. The greater the degree to which the responsibility of teachers for teaching syllabuses is carried forward to the examinations at the end of the course the more will they be spared the frustrations which can on occasion arise from working to centrally prescribed syllabuses, and a desirable variety of courses will be fostered.

159. There are two ways in which teachers can be associated with examinations which are not the sole responsibility of their own establishments. First, they can be represented on the national body concerned with the award of the examination qualification, irrespective of whether the examinations are conducted externally or otherwise. Second, they can have the initial responsibility for setting examinations and for marking the papers of their students.

Third Principle

160. The adjustment of examinations to courses should be matched by the award of qualifications which have an assured national currency as meeting the needs of employers and students generally. The levels of passes and distinctions also need to be uniform throughout the country. Common standards in these respects can be achieved by external examinations and by examinations which are set and marked by the teachers and then assessed and endorsed by a national body.

161. The external assessment of internal examinations has been in operation for decades for the award of national certificates and diplomas by Joint Committees composed of representatives of the Department and of professional bodies, and the system has been extended considerably in recent years. The Joint Committees issue guidance on syllabuses and approve courses and not merely examination arrangements, taking account of the facilities available, including staffing: they prescribe minima for entry qualifications, the duration of the course and marks; and they appoint national assessors. External assessment applies to the examination of the papers to be set and to the marking of scripts. With these arrangements the initiative of teachers in planning their courses and conducting the examinations can be matched by national awards. We understand that the recently established Council for National Academic Awards similarly satisfies itself about the standard of courses leading to its degrees although the machinery used for awards at this level differs from that just described. One difference is the appointment of external examiners by the teaching establishment under arrangements approved by the Council, instead of the national appointment of assessors. There is clearly room for variations in the respective roles of the teaching establishment and the assessing body in agricultural examinations, depending on the level of the course, the degree to which it is specialised and distinctive of the particular college, and on other considerations.

162. There are two aspects of the national currency of qualifications which deserve special mention against the background of the present agricultural examinations ; there should be a simple system, readily understood ; and the terminology which is common in other disciplines should be adopted whenever possible.

Current Examination Arrangements and the Need for Rationalisation

163. The current examinations stem from initiatives taken at different times over the past seventy years. Appendix C gives particulars of those which are organised by 17 examining bodies. There are five Boards constituted solely for the purpose of examining students who have (with minor exceptions) followed full-time courses in agricultural subjects. The National Agricultural and National Dairy Examination Boards conduct Diploma examinations only in Agriculture and Dairying; they are composed of representatives of the agricultural societies named in Appendix C, with an observer from the Department. Independently, the National Certificate in Agriculture Board deals with the certificate level in agriculture and in agriculture with home economics, and has recently approved the certification of supplementary courses. It is composed of representatives of the industry, teaching establishments and central and local government. The Examination Board in Agricultural Engineering is appointed by the Council of the Institution of Agricultural Engineers and includes teachers, representatives of the Agricultural Engineers' Association and of the Royal Agricultural Society of England and departmental assessors. The National Poultry Diploma Board conducts examinations at all the levels at which full-time poultry courses are offered. The Board includes representatives of all the teaching establishments as well as of a wide range of industrial, educational and governmental bodies, but it appoints a separate Examinations Committee of nine members none of whom is connected with the teaching establishments which enter candidates. Three other bodies whose interest centre on agricultural and horticultural subjects offer examinations: the Royal Horticultural Society, the Royal Association of British Dairy Farmers, the National Association of Groundsmen. The Royal Horticultural Society conducts examinations at various levels, as one of its activities as a Society, operating through an Examinations Board consisting of Council members and invited members. Full-time students and others take the Society's examinations, but attendance at a course is a condition of admission to the examination only for its National Certificate in Horticulture. Four bodies have a wider, but still specific, field of interest (Institute of Park and Recreation Administration, Royal Institution of Chartered Surveyors, Chartered Auctioneers' and Estate Agents' Institute, Chartered Land Agents' Society).

164. All these examinations are external with the exception of those for the National Certificate of Agriculture and, under arrangements operating for the first time in 1965/66, for the National Diploma in Agricultural Engineering. The examining bodies for both of these assess and endorse the results of internal examinations. The Royal Institution of Chartered Surveyors and the Chartered Land Agents' Society recognise certain college examinations for exemption from their own.

165. There are also five general examining bodies who offer agricultural examinations, and these are taken by most of the part-time students. The City and Guilds of London Institute offers examinations for part-time agricultural courses at craft and technician levels (appointing advisory committees for each subject or group of subjects). Three of the Regional Examining Unions and the Local Government Examinations Board offer a more limited range of examinations.

166. It is customary for full-time diploma students to take college examinations before the external examinations. A pass in the former is now a condition of entry to the examinations for the National Diploma in Agriculture and the National Diploma in Dairying.

167. This broad development contains elements which can clearly be incorporated in a more rational system and those who have been involved in the arrangements have a fund of experience which can be of immense value for the future. As the structure now stands we detect the following weaknesses:

(*a*) The representation of industry varies as between the different bodies. It needs to be effective in all of them in order to ensure that full weight is given to the requirements of employment.

(*b*) The extent to which teaching establishments have formal links with the examining bodies also varies. Effective links are essential for securing the modifications of examinations which are needed from time to time, and they should be made uniform and adequate.

(*c*) There are elements of rigidity in some of the present external examinations, and more flexible arrangements are desirable.

(*d*) Standards at each level vary within agriculture and horticulture and the terminology differs from that in use in other disciplines, creating difficulties for intending students, careers advisers and employers. Uniformity in these respects should be the aim.

(*e*) Eight examining bodies concerned solely with agriculture and horticulture and nine with wider interests operate independently of one another and, for the most part, of the teaching establishments, without any co-ordination. There is no body responsible for reviewing the whole field and in a position to ensure, for example, that examinations are revised in response to course needs, that gaps are filled, that there is always progression from one stage to another and that common standards apply to papers and marking.

168. These weaknesses have been noted, often with emphasis, in the evidence we have received. In particular, numerous bodies representing teachers, local authorities and others connected with the teaching establishments which have to comply with the multiplicity of examination requirements have pressed for radical changes. Their principal proposals have been the substitution of internal examinations, externally assessed, for external examinations, and the creation of some kind of national body for agricultural examinations.

169. We accept the view that it is high time to establish a coherent national pattern of agricultural examinations, and that it should be flexible so as to allow for future development. In other disciplines the national certificates and diplomas administered by Joint Committees(1) have been adapted to changing circumstances, and comparable standards and a common terminology have been maintained. It is now time to achieve similar results in agriculture by removing the above weaknesses. With this in mind we have framed proposals to give effect to the principles defined above.

---

(1) See paragraph 161.

170. Our proposals are the following:

(*a*) The introduction of a new examination structure corresponding to the new types of course proposed.

(*b*) The provision of the opportunity for establishments to secure the external assessment of internal examinations for full-time and sandwich courses.

(*c*) The creation of a central body for agricultural examinations and of new award-giving boards.

171. *A new examination structure*

(i) The new courses could not operate without this because the main current diploma examinations do not fit them. For example, the current National Diploma in Agriculture examination follows a course which straddles the Ordinary National Diploma and Higher National Diploma levels which we propose. Again, horticulture will require a definitive qualification at the Ordinary National Diploma level and a Higher National Diploma qualification awarded after attendance at an approved course.

(ii) Terminology is important. We have proposed Ordinary National Certificate, Ordinary National Diploma and Higher National Diploma type courses with academic entry standards similar to those which are generally applicable to corresponding courses in other disciplines. We regard this as being essential when standard national terms are adopted.(¹)

(iii) It would be possible to indicate whether the qualification was awarded for a general or specialised course e.g. OND (Agriculture), OND (Pig Husbandry).

(iv) A problem occurs with the terminology of qualifications for courses that will not be superseded by the new ones which we are recommending, i.e. certificate and supplementary courses. In other disciplines national certificate courses are part-time and national diploma courses full-time or sandwich. However, national diploma courses last two years or longer so it would be at variance with general practice to award a diploma for a one year course, although full-time, at the level of the present National Certificates in Agriculture, Horticulture and Poultry Practice. It may cause less confusion to retain the term certificate for these qualifications.

(v) A student who has obtained a National Certificate in Agriculture or Horticulture and then completes a supplementary course will have studied two years full-time but he will not have needed Ordinary National Diploma entry qualifications to join the certificate course. This Diploma should be awarded only on successful completion of a fully integrated course, with specified entry qualifications, and we

---

(¹) Some complications arise owing to the existence of Diplomas which are awarded in respect of training by establishments which are not primarily teaching institutions, and of Diplomas, sometimes called National Diplomas, which can be obtained without attendance at a course of study or as a result of a very short course. We hope that it will be possible to obtain the co-operation of all the bodies concerned in rationalising the nomenclature.

would not regard it as appropriate to award it for the completion of a supplementary course. Supplementary courses have a definite contribution to make in their own right, and should be suitably recognised. We suggest that they should lead to a Technician Diploma. The subject of the course could be added. A supplementary course in Farm Organisation and Management taken by a mature person *with some years of practical experience in farming* after completing a certificate course might lead to a Higher Technician Diploma. It would probably be desirable to specify a minimum age for this.

(vi) We regard it as the task of the proposed central body to settle the future pattern of examinations which we have outlined.

172. *Internal examinations, externally assessed*

(i) These will involve the student in one final examination only, normally held at his own establishment, instead of separate internal and external examinations.

(ii) Special arrangements for an examination to be set jointly by two or more establishments, or for external examinations, may be appropriate in some cases, for example in some specialisms where numbers are small and the industrial conditions, and consequently the courses, are fairly uniform.

(iii) There is no need to restrict external assessment to the written papers. Projects and investigations carried out as part of the course, and similar practical activities can all contribute to the assessment. This wide range of possibilities should be fully exploited in order to achieve assessments which are meaningful in their respective fields, which provide realistic incentives for students and teachers alike, and in which potential employers can have reasonable confidence.

173. *A central body for agricultural examinations*

The creation of a central body is an innovation which provides the key to the rationalisation of agricultural examinations. The remainder of this chapter is devoted to it and to related examination organs.

174. An effective central body would need to exercise the essential functions of ensuring:

(*a*) that examinations respond to course needs, and therefore to the needs of the industry;

(*b*) that there is an adequate range of examinations, including the introduction of any new awards that may become necessary;

(*c*) that suitable standards are prescribed; that these are common at each level in the various branches of agriculture and horticulture; that they would allow all diligent and reasonably competent students to pass and that higher gradings can be allotted;

(*d*) that the standards are comparable to those in other technologies;

(*e*) that appropriate titles are selected for qualifications;

(*f*) that suitable arrangements are made for determining the mode of examination and for the national assessment of examinations and, generally, that the teaching establishments enjoy adequate freedom and are associated with the national examination system;

(*g*) that establishments have the opportunity to appeal about the general conduct of the examinations;

(*h*) that the membership of boards responsible for particular examinations or groups of examinations is drawn in suitable proportions from appropriate quarters, and interlocks with membership of the central body.

In addition to these essential functions relating to examinations we envisage that the central body should from time to time review the number of students in the courses leading to the various examinations, and consult the Department as necessary about the national distribution of courses.

175. A central body discharging these functions could be conceived in one of two ways:

A. It could be an award-giving body with full powers, concerned both with examination policy and with the assessment of examinations.

or B. It could be a co-ordinating body charged with defined functions, with award-giving boards operating within the terms of reference that it lays down for them.

176. Alternative A would constitute a body with full power to control standards horizontally across the full range of agricultural examinations and to secure the vertical integration of qualifications. It would be well placed to deal with the common elements in various agricultural examinations and with the points at which other disciplines such as engineering and economics impinge on all of them. The numbers taking examinations at the end of full-time courses each year—about 3,000—are by no means excessive for one examination organisation; indeed they are a powerful financial argument for concentration.

177. Nevertheless, there are complicating factors. Whilst the field of examination candidates is comparatively small, a variety of courses is needed and sub-committees or boards would have to be appointed to deal with different qualifications or groups of qualifications; the Joint Committees in other disciplines are each responsible for a narrow range of qualifications, sometimes only at one level, or even for one qualification only. A centralised machine could handle the new national certificate and diploma qualifications which we have proposed, but it would not be appropriate, for example, for the regional examination of part-time courses.

178. Taking into account the factors just mentioned we recommend alternative B, i.e. a co-ordinating body; but we emphasise that it must have powers to fulfil its purpose of exercising the functions defined in paragraph 174. We suggest that it should be called the Council for Agricultural Examinations.

179. The co-operation of the numerous organisations concerned with education in agriculture, including those associated with the present examinations, would be of great importance in the introduction of a co-ordinating body. The active participation of those who could speak with knowledge of the practical needs of the industry would be vital to the success of this body and of its associated boards. There is no professional body similar to those who form the partners with the Department in many Joint Committees administering national certificate schemes. Indeed, the proposed Council might well in due course be instrumental in promoting arrangements for conferring a professional qualification.

180. Examination bodies established in recent years provide examples of widely differing constitutions ranging from those composed entirely of nominated individuals who are prominent in relevant spheres, to those consisting entirely of representatives of numerous organisations, mostly professional institutions. The basic consideration for agriculture is the strength and effectiveness of the Council. It should not be too large. It should consist of members who can speak with authority from experience in industry, education and central and local government; and they should be nominated by the Secretary of State, to serve for periods of three years. (A central body deriving its authority from representation would be large—as can be seen from the numerous organisations shown in Appendix C as being associated with the present examinations.)

181. A Council as a co-ordinating body would not be burdened with the routine work of assessing examinations. The functions as defined do not include any tasks of set regularity, although it would be heavily involved in its first year in introducing the new examinations structure. It would not require a full-time secretariat, and we hope that the Department will be prepared to provide secretarial services and meet its expenses.

Award-giving Boards

182. Associated with the Council there would need to be award-giving boards. Their functions in dealing with the external assessment of internal examinations would include the definition of the scope and content of acceptable courses, the approval of schemes in which establishments describe proposed courses (including syllabuses) and examination arrangements, the approval or appointment of assessors, the handling of examination papers and scripts for purposes of assessment and the issuing of certificates and diplomas.

183. Boards could be constituted, under the Council, each to deal with all subjects at certain levels or with one subject at all levels. Knowledge of the subject is the decisive factor; a suitably constituted board should be able to deal with all levels of its subject. We therefore recommend a vertical organisation with boards responsible for qualifications for the following courses:

Board A. Higher National Diploma, Ordinary National Diploma and Supplementary Courses in AGRICULTURE.

Board B. Higher National Diploma, Ordinary National Diploma and Supplementary Courses in HORTICULTURE.

Board C. Higher National Diploma, Ordinary National Diploma and Supplementary Courses in POULTRY HUSBANDRY.

Board D. Ordinary National Diploma and other full-time Courses in AGRICULTURAL ENGINEERING(1).

Board E. Higher National Diploma and Ordinary National Diploma Courses in DAIRY TECHNOLOGY(2).

---

(1) We understand that the Institution of Agricultural Engineers would welcome this kind of link with the central body for agricultural examinations, but that it would also regard it as essential to develop contacts with the bodies concerned with engineering examinations.

(2) The need for a separate Board for Dairy Technology, and its relationship to the agricultural examination system, will be subject to further consideration in the light of discussions which we understand are in progress between the Department and the food industries. The dairy industry is a party to these discussions.

Experience may well suggest modifications of this Board organisation in the course of time.

184. We understand that some of the organisations which are responsible for the present external examinations in agriculture subsidise them. We consider that, as in other spheres, the machinery for external assessment should be financed from fees. A reasonably uniform level of fees will be desirable in the various branches of agriculture, and it will be necessary for the Council to give special attention initially to the likely budgets of those Boards which can expect only comparatively small numbers of candidates.

185. The award-giving boards, each covering a narrower range than the Council, should be composed mainly of representatives nominated by industrial and teachers' organisations, with representatives of the Department. In addition there should be provision for the Council to nominate other persons with knowledge and experience of other organisations currently involved in this sphere. The membership should interlock with that of the Council, and members should serve for a set period. Having regard to their predominantly representative constitution we suggest that these boards might be called Joint Examination Boards.

186. Our recommendations for new examinations machinery are related to full-time courses above the certificate level on which we have been asked to report. Rationalisation is, however, essentially a comprehensive concept and we record our view that those who are concerned with action on our recommendations should take into account the whole field of agricultural examinations, and consider, in particular:

(*a*) The desirability of the Boards recommended in paragraph 183 covering also certificate courses—the majority of full-time students are in these courses; and their relationship to, and differentiation from, supplementary and Ordinary National Diploma courses will require careful definition.

(*b*) The desirability of any new part-time Ordinary National Certificate or Higher National Certificate type courses that may be established in agricultural subjects being brought within the purview of the appropriate Board.

(*c*) The desirability of the proposed Council being in a position to extend its interest to qualifications awarded on the completion of part-time and block release courses. Students pass from these to full-time and sandwich courses, and vice versa, and the interrelationships of the qualifications are important. Moreover, the prospective developments in the demand for educational courses resulting from the extension of industrial training emphasise the advantage of having a central body for examinations which, like the proposed Industrial Training Board, will be able to consider the whole range of provision, and work in close consultation with that Board.

187. Negotiations to implement our proposals will need to take account of the students from colleges in Scotland and Northern Ireland who enter for some of the current diploma examinations.

Chapter 8. THE INSTITUTIONAL PATTERN

The Present Scene

188. Full-time courses lasting one year or longer are provided for 4,000 students in 41 agricultural establishments. County institutes of agriculture are widely spread over 36 of the 59 administrative counties of England and Wales outside Greater London. Each serves also as a point of inspiration and stimulation for part-time courses. Five agricultural colleges are maintained by Governing Bodies, mostly with the help of grant from the Exchequer. The establishments are comparatively small and could be expanded with advantage if additional student places were required. Such growth in demand as the evidence suggests may occur would not require any increase in the number of centres for full-time residential courses, which need not be near the homes of students.

189. With one exception (Wisbech) the 41 establishments are monotechnics. The widening of the curriculum which has been taking place—for example, giving increasing attention to engineering and economics in agricultural courses—calls for staff competent to teach an increasing number of subjects; but many subjects require only a modest number of time-table hours in the establishments as a whole with the result that the range of full-time staff teaching them may be severely limited. An extension of the work of an establishment by the addition of other departments, for example food subjects, might well improve the teaching and other resources for subjects it already covers. There is no *a priori* reason why a local education authority should restrict the range of subjects handled by an institute, provided that agriculture continues to be taught in a commercial context through the medium of the teaching farm.

190. General technical colleges are playing an increasing part in agricultural education. Some have departments of agriculture and noteworthy programmes of short courses for adults, to which we attach great importance. Geographically the technical colleges make possible the nation-wide provision of part-time courses. Academically their staff and equipment for such subjects as engineering, sciences, commerce and the office arts contribute to courses which are run jointly with agricultural establishments. With each type of establishment making its distinctive contribution to a jointly planned course the limitations recorded in the preceding paragraph can be largely overcome. We look forward to further extension of the role of the general technical colleges in agricultural education, working in close consultation with the agricultural establishments. They need to be suitably equipped for the agricultural courses which they undertake.

191. In developing courses at technical colleges careful attention should be given to the value of short block periods at teaching farms. These are available at the agricultural education establishments and at some technical colleges; a few counties run them separately. We hope too that the improvement of industrial training arrangements will lead to closer links between commercial farms and the educational service.

192. In 1946–47 the Loveday Committees on Higher Agricultural Education and on Agricultural and Horticultural Institutes agreed that two-year courses should be provided in the independent colleges and one-year basic courses (with appropriate supplementary courses) in the county institutes. This division of work has never been complete. There are courses leading to the National Diploma in Agriculture at the Essex and Lancashire Institutes and a post-diploma course at the former; most full-time students qualifying for the Intermediate Examination of the National Diploma in Horticulture do so from the Essex and Pershore Institutes; on the other hand there are one-year courses below diploma level at all but two of the colleges. The introduction of supplementary courses, higher levels of recruitment and improved teaching methods have raised the standards of work at county institutes. Administration by independent governors or by local authority is not a clear dividing line for the level of work.

193. A point associated partly with this widening range of work has been put to us. It concerns the naming of county agricultural establishments. These have avoided the term "college", whereas most other further education establishments which provide full-time courses at any level are called colleges. It is held by some that the use of the term "institute" or "school" for the agricultural establishments sets them apart, to no good purpose, from the establishments attended by other students in the area. We see no reason why local education authorities should refrain from applying the term "college" to their agricultural establishments which run full-time courses if they wish to do so. The present "agricultural colleges", which are maintained by their Governing Bodies, are well known by their individual names.

Future Developments

194. Whilst it would be futile and misguided to attempt to restore a rigid two-tier system of establishments, a rational pattern of full-time courses will require differentiation in the work of the various establishments, each having the facilities to fulfil its particular role effectively. Courses, mostly of two years' duration, leading to the current diplomas are offered at eight of the 41 establishments. Another thirteen offer supplementary courses. The proposals made in this report will result in greater diversification. Some of the present diploma centres will probably wish to offer both Ordinary National Diploma and Higher National Diploma courses, and some other establishments will no doubt wish to introduce Ordinary National Diploma courses, whilst continuing to offer part-time and one year courses. A few proposals for degree courses may emerge. We should emphasise that those establishments which do not provide full-time courses at the higher levels have much to do in extending the range of technical education available for the industry. In particular more provision of short courses and conferences for mature persons is a pressing need, and must be met for the most part by the establishments which primarily serve their own and neighbouring areas. Additional residential accommodation is being provided in building programmes partly with this purpose in mind; it can be supplemented during vacations by the accommodation occupied during the normal terms by full-time students.

195. Criteria relevant to decisions on the distribution of courses include:

(*a*) The suitability of the farm or holding for the commercial enterprise related to the course.

(*b*) Economy in the use of resources.

(*c*) Demand.

196. *The suitability of the farm or holding*

Most courses at agricultural establishments are linked with commercial enterprises on the teaching farm or holding. The suitability of the location for the related enterprise, in respect of soil and climate, is accordingly a factor which has to be taken into account.

197. *Economy in the use of resources*

A particular course requires use of the farm, teaching accommodation, equipment and staff. Undue dispersal of courses accentuates the difficulties which small establishments find in affording a suitable range of facilities. Adequate facilities must be provided; and when provided at a centre they should be reasonably well used. The desirability of an additional intake at an establishment running a course should be considered before another is started elsewhere. These considerations apply most forcibly to courses at the higher levels and in specialisms such as pig and poultry farming and horticulture.(¹)

Demand

198. Even if the number of full-time agricultural students grows, the number requiring each type of full-time course above "certificate" level will remain comparatively small. In many instances a particular type will be justified at one centre only. In this context we should add that a slight variation in syllabus is not sufficient reason for establishing an additional course which would not otherwise be justified by the total numerical demand in the country. Representatives of local authorities have assured us that they would recommend their constituents to give sympathetic consideration to applications from students for financial grants to attend courses outside their own areas, provided these have been approved as making a necessary contribution. We regard this as being essential for the realisation of a rational and economical distribution of courses.

Approval of Courses

199. The arrangements for the approval of courses on behalf of the Secretary of State, under Regulation 10 of the Further Education (Local Education Authority) Regulations 1959, are administered regionally. They apply to advanced courses, including those which have an entry requirement of passes at the Advanced level of the General Certificate of Education or of an

---

(¹) It has been represented to us that full-time courses in horticulture should be concentrated at one centre equipped with full facilities for all branches of the subject. Whilst considerations of soil, climate, crop distribution and the range of specialisms to be covered lead us to believe that more than one horticultural centre is needed for full-time courses we recognise that this suggestion springs from a desire to avoid the acceptance of students for courses which lack adequate facilities. We must note too the insistence of the horticultural industry that courses must be run with adequate resources if employers are to be induced to offer the students posts which require knowledge of sound commercial practice.

Ordinary National Certificate or Diploma or the equivalent. Thus, for example, they cover Higher National Diploma but not Ordinary National Diploma courses. In agriculture they cover supplementary courses, which start at "certificate" level, but not two-year integrated courses or sandwich courses which start at a lower level, although in the end these may cover the same subject matter as certificate and supplementary courses. The colleges in receipt of direct grant require the approval of the Department for new courses. The distribution of advanced courses is thus subject to control, and there are standards regarding the minimum numbers of students which apply generally to them.

200. The Ordinary National Diploma type courses which we have proposed will serve regional and national needs. Some system of central approval of courses is clearly necessary in order to secure a reasonable regional and national distribution of these. The system should apply also to any full-time courses that admit students below the advanced level, such as full-time courses which an establishment wishes to offer without national certification, or with certification by a body other than an agricultural examination board; and full-time courses leading to a collection of "part-time" qualifications. The previous Advisory Sub-Committee(1) in 1960 recommended co-ordination through Schemes of Agricultural Education. These Schemes were prepared by county education authorities, in consultation with Regional Advisory Councils, and approved by the Secretary of State under Section 42 of the Education Act 1944. We recommend that local education authorities should be required to obtain the approval by the Secretary of State under this Section of new full-time courses of agricultural education which are not covered by approved Schemes or by the arrangements for the approval of advanced courses which are described in the preceding paragraph.

201. The arrangements we have recommended for agricultural examinations will require the approval by the appropriate joint examination board of courses which are submitted for the purpose of the award of a national certificate or diploma. The board will be concerned with the first criterion listed in paragraph 195, the suitability of the farm or holding for the related enterprise. It will need to keep in close contact with the Department, which will have to take related decisions on the approval of the provision of the course under the Regulations or under Schemes, as indicated in the preceding paragraphs.

202. To make the national pattern of courses effective the Department should take suitable steps to publicise it. The annual publication of full-time courses in List 185(2) affords a convenient regular medium for this, but there may be occasions on which special announcements are desirable.

Advice to Students

203. Intending students require advice on courses and they should be able to obtain this from their schools, from the youth employment service and from agricultural education staffs. In the case of persons in county boroughs,

---

(1) National Advisory Council on Education for Industry and Commerce. Advisory Sub-Committee on Further Education for Agriculture. First Report, 1960. Paragraph 26

(2) Full-time Agricultural Education in England and Wales. List 185, Department of Education and Science and Ministry of Agriculture, Fisheries and Food.

this may entail reference to county agricultural education staffs. In this context we emphasise that we regard it as the responsibility of authorities and agricultural teachers to advise on the course best suited for the individual student, a point which is particularly significant in agriculture where most courses above the basic certificate level deal with special branches of production, and where we are recommending that courses should now be related more closely to specified entry levels. In their rôle as advisers to students staffs should not be concerned solely with recruitment to their own establishments. It would be helpful if officers of the advisory services of the Ministry of Agriculture, Fisheries and Food used the opportunities open to them to advise young workers on vocational training and education.

Relations with Industry

204. In developing their courses establishments need to maintain close contact with industry. This is a two-way traffic. Those involved in the practical problems of production can participate in defining the aims and content of courses, thus ensuring that these meet current needs. In turn, if brought into consultation, they are able to make the educational provision better known in the industry. With the changes that are taking place and likely to continue we consider that this type of consultation needs to be placed on a regular footing. We accordingly recommend that the teaching establishments should have Governing Bodies that are adequately representative of industry and that these should appoint Advisory Committees for the various departments of the establishments.

205. We have recommended courses at various levels corresponding to those which are provided by further education establishments for other industries, and also the use of the course and examination terminology which is generally accepted. The development of these courses, coming at the same time as the creation of the Industrial Training Board for agriculture, opens the way to a new era of co-operation between teachers and the industry to meet the needs of the future. Only an awareness of the current problems in education and training and the co-operation of the various sections of the industry will bring about the advances which seem to us to be essential if productivity in agriculture is to increase along with that in the rest of our industries.

GLOSSARY

(a) Industry and Occupations

Farm	In general sections includes a horticultural and any other specialist holding.
Farmer	In general sections includes a horticultural grower and other specialist producer.
Enterprise... ...	A particular husbandry or horticultural unit which may form part only of a farm or a horticultural business.
Operative ...	A worker who carries out routine tasks of a non-specialist nature which are learned largely by practice and experience.
Craftsman ...	A worker who fulfils routine tasks of a specialist nature and understands the basic principles behind the performance of these tasks.
Technician ...	One who is responsible for production units and who may be in an intermediate position between the craftsman and management. He should be capable of comprehending and operating a process or a line of production given to him.
Technologist ...	One with advanced qualifications who has studied the fundamental principles of his chosen technology and should be able to use his knowledge and experience to initiate practical developments.
Foreman	In agriculture, one who holds a key position on the farm. His responsibility and work varies according to the nature of the farm enterprises, but may be defined generally as the task of carrying out within the limits of his authority the implementation of the business policy of the farm.
Farm Manager...	One responsible for the conduct of the farm business as a whole. He should have studied the science and economics of agriculture, dairying or horticulture and have a thorough understanding of the principles behind practice.

(b) Course organisation

Full-time course ...	Continuous study not necessarily occupying the whole of an academic year.
Sandwich course ...	A course consisting of alternate periods, of not less than 19 weeks, of full-time study in a technical college and of supervised experience in industry, usually extending over a number of years. Thick sandwich: involving at least one complete year in industry. Thin sandwich: involving shorter periods in industry usually with both college and industry periods of five to six months. Industry-based student: student following a sandwich course who is employed by a firm which makes arrangements for him to attend a suitable college course and provides the associated period of industrial training in its own works. College-based student: student following a sandwich course who is not primarily an employee of any particular employer but who has enrolled directly at a college. The College is responsible for arranging periods of industrial experience.

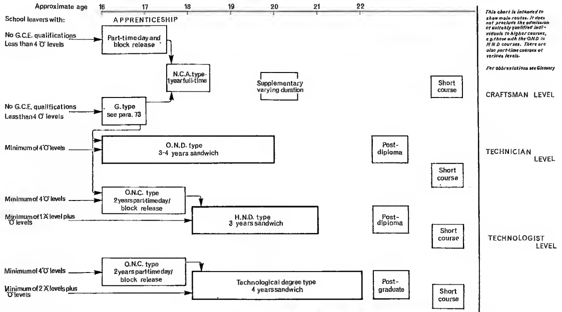
Part-time day course	Day-time attendance usually on one day a week possibly with some evening attendance.
Day release ...	The system by which employers free employees from work without loss of pay for the purpose of obtaining further education in part-time day courses.
Block release ...	The system by which employers free students (with pay) to attend short periods of full-time study, usually of several weeks' duration, each year The amount of time available for study may be little more than that provided under day-release arrangements, but in some cases it falls only a little short of that provided on a sandwich course. Part-time classes may be used to bridge the period between spells of block release.
" G " (or General) course	Part-time preparatory course on the basis of which students, without the necessary G.C.E. qualifications to go direct into an O.N.C. course, may qualify to enter an O.N.C., O.N.D. or a technician's course. (To be distinguished from courses in general agriculture or general horticulture at various levels.)
Certificate course...	Currently in agriculture, a one-year full-time course leading to the examination for the National Certificate in Agriculture, the National Certificate in Horticulture or the National Certificate in Poultry Practice. Referred to in this report as certificate course, in contrast to Ordinary National Certificate course (see (*c*) below).
Diploma course ...	Currently in agriculture, a full-time course, usually of two years' duration, in general agriculture, dairying, estate management, horticulture or poultry husbandry.
Supplementary course	In agriculture a full-time course following a one-year certificate course.
Post-Diploma course	In agriculture a full-time course following a diploma course.

(c) *Examination Qualifications*

School Qualifications	*" O "* Pass in the General Certificate of Education at the Ordinary Level. *"A"* Pass in the General Certificate of Education at the Advanced Level. *C.S.E.* Certificate of Secondary Education (references to " O " should be read to include equivalent performance in this new examination).
Further Education Qualifications	*O.N.C.* Ordinary National Certificate. A qualification obtained after a part-time course usually of two years' duration for students of 16+with four " O "s or suitable performance in " G " courses (see (*b*) above). *O.N.D.* Ordinary National Diploma. A qualification obtained after a two-year full-time or a three-year sandwich course similar in entry requirements and standard to the O.N.C. but fuller in treatment. (*Note:* Paragraphs 68 and 74 of the report explain that in agriculture we expect O.N.D. and O.N.C. courses to differ in character, O.N.D. courses normally being ends in themselves, and O.N.C. courses serving as routes to H.N.D. courses.) *H.N.C. Higher National Certificate*—A qualification obtained after a two-year part-time advanced course for students of 18+ with at least one "A" and " O "s or suitable performance in O.N.C. or O.N.D.

	H.N.D. Higher National Diploma—A qualification obtained after a two- or three-year full-time or three- or four-year sandwich course with entry requirements similar to H.N.C.
Joint Committee ...	A Committee comprising representatives of the Department of Education and Science, one or more professional institutions and teachers in technical colleges to administer schemes for National Certificates and Diplomas.
Dip. Tech. ...	Diploma in Technology. Qualification in technology equivalent in standard to a university honours degree, awarded after a four-year sandwich course with entry requirements of two "A"s and three " O "s or O.N.D. or O.N.C. (superseded in 1965 by degrees of C.N.A.A.).
C.N.A.A.	Council for National Academic Awards. Established by Royal Charter to grant and confer degrees, diplomas, certificates and other academic awards and distinctions comparable in standard to awards granted and conferred by universities to and on persons who have pursued courses approved by the Council at educational establishments other than universities.

PROPOSED PATTERN OF MAIN FULL TIME COURSES IN AGRICULTURE OUTSIDE UNIVERSITIES



This chart is intended to show main routes. It does not preclude the admission of suitably qualified individuals to higher courses, e.g. those with the O.N.D to H N D courses. There are also part-time courses of various levels.

For abbreviations see Glossary

Appendix A

A.—Bodies who presented oral evidence to the Committee

Association of Agricultural Education Staffs of Local Authorities
  Mr. A. G. Harris
  Mr. R. C. Swan

Association of Education Committees
  Mr. P. Lord

Association of Principal Agricultural Education Officers
  Mr. W. J. Garnett
  Mr. P. A. Missen
  Mr. E. C. Pelham

Association of Principals of Technical Institutions
  Mr. S. F. Trustram

Association of Teachers in Technical Institutions
  Mr. J. Longden

Chartered Auctioneers' and Estate Agents' Institute
  Mr. D. Chapman

Chartered Land Agents' Society
  Mr. J. P. Banbury
  Mr. A. R. Eden

City and Guilds of London Institute
  Mr. M. H. R. Soper
  Mr. P. C. Stevens

Conference of Principals of Agricultural Colleges
  Mr. F. H. Garner
  Miss E. Hess

County Councils' Association
  Mr. G. S. Bessey
  Mr. L. W. K. Brown
  Alderman J. R. Coxon
  Sir Alan Lubbock

Examination Board in Agricultural Engineering
  Miss J. P. Housley

Horticultural Education Association
  Dr. L. Broadbent
  Mr. R. G. C. Downs
  Dr. M. E. Marston

Horticultural Trades Association
  Mr. M. Slocock
  Mr. R. Townsend

Institute of Park and Recreation Administration (Inc.)
  Mr. T. L. Ashton
  Mr. J. R. B. Evison
  Mr. K. L. Morgan

Institution of Agricultural Engineers
  Mr. J. H. W. Wilder

Joint Committee of the Milk Marketing Board and Central Milk Distributive Committee
- Mr. C. J. R. Bedford
- Dr. H. B. Cardwell
- Mr. H. Cooke
- Professor E. L. Crosley
- Mr. F. Procter
- Dr. A. L. Provan
- Mr. J. Ridley Rowling

London County Council
- Mr. E. Walker

Milk Marketing Board
- Mr. H. R. Jones

National Agricultural Advisory Service
- Mr. D. C. Barber
- Mr. W. Emrys Jones

National Agricultural Examinations Board

National Dairy Examinations Board
- Professor E. L. Crossley
- Mr. F. R. Francis
- Mr. F. Russell
- Mr. J. W. Shirley
- Mr. J. Stevenson

National Certificate in Agriculture Examinations Board
- Mrs. O. U. Foss
- Mr. M. C. Mason

National Farmers' Union
- Mr. R. A. Burton
- Mr. H. Cossins
- Mr. T. D. Dampney
- Mr. G. E. Limb
- Mr. J. R. Macdonald
- Mr. H. C. Mason
- Mr. G. R. G. C. Tickler

National Poultry Diploma Board, Ltd.
- Dr. R. Coles
- Mr. A. Hugh Hudson
- Mr. S. Fox
- Dr. H. Temperton

Royal Horticultural Society
- Mr. J. Hamer
- Mr. A. G. Healey
- Dr. R. H. Stoughton

Royal Institution of Chartered Surveyors
- Mr. A. Bailey

Welsh Joint Education Committee
- Mr. D. Andrew Davies
- Mr. T. Glyn Davies
- Alderman Llewellyn Heycock
- Mr. Iowerth Howells
- Mr. D. Owen Jones

B.—Organisations and individuals who submitted written evidence

(i) *General*

Agricultural Advisory Council
Agricultural Department of Wolverhampton Technical Teachers' College
Agricultural Education Association
Association of Agricultural Education Staffs of Local Authorities
Chartered Auctioneers' and Estate Agents' Institute
Conference of Principals of Agricultural Colleges
East Anglian Regional Advisory Council for Further Education
Essex Local Education Authority
Farm Buildings Association
Miss E. Hess, N.D.H.
Horticultural Advisory Council for England and Wales
Institution of Agricultural Engineers
Institute of Park and Recreation Administration (Inc.)
Kent Education Committee
National Association of Principal Agricultural Education Officers
National Certificate in Agriculture Examinations Board
National Farmers' Union
Northern Advisory Council for Further Education
North Western Regional Advisory Council for Further Education
Principals of Agricultural Colleges
Principal Agricultural Officers of the South-East Region
Regional Advisory Council for the Organisation of Further Education in the East Midlands
Regional Council for Further Education for the South-West
Royal Association of British Dairy Farmers
Royal Institution of Chartered Surveyors
Mr. F. W. Shepherd
Southern Regional Advisory Council
Staffordshire Sub-Committee for Agricultural Education
Studley Conference on Dairy Education
United Kingdom Agricultural Students' Association
Welsh Joint Education Committee
West Midlands Advisory Council for Further Education
Professor H. T. Williams
Women's Farm and Garden Association
Yorkshire Council for Further Education
Yorkshire (West Riding) Local Education Authority

(ii) *Employers*

Agricultural Engineers' Association
Agricultural Research Council
Association of British Manufacturers of Agricultural Chemicals
Association of British Pharmaceutical Industry
Association of Municipal Corporations
British Egg Marketing Board
Co-operative Wholesale Society
Fatstock Marketing Corporation
Fertiliser Manufacturers' Association
Fruit and Vegetable Canners' Association
Horticultural Trades' Association
Joint Committee of the Milk Marketing Board and Central Milk Distributive Council
Milk Marketing Board
Ministry of Agriculture, Fisheries and Food
National Association of Corn and Agricultural Merchants

National Association of Frozen Food Producers
Nature Conservancy
Pig Industry Development Authority
Potato Marketing Board
Sausage Manufacturers Association
Sports Turf Research Institute
Welsh Agricultural Organisation Society

(iii) *Educational Establishments*
Dorset Farm Institute
Durham School of Agriculture
Essex Institute of Agriculture
Harper Adams Agricultural College
Kent Farm and Horticultural Institute
Lancashire County Institute of Agriculture
Lincs. (Lindsey) Farm Institute
Pershore Institute of Horticulture
Royal Agricultural College
Seale Hayne Agricultural College
Shropshire Farm Institute
Shuttleworth College
Studley College
Waterperry Horticultural School
Yorkshire (East Riding) Institute of Agriculture

MANAGEMENT EDUCATION IN AGRICULTURE

1. Management in agriculture, as in other industries, involves making decisions between a number of practices and courses of action which may be followed. The range of possible practices has been increasing and changing at an accelerated pace during recent years. We are concerned here not with husbandry management in the sense of the control of animals and crops, but with management in the sense of the motivation and control of human activity.

2. Management education in agriculture is the study of this motivation and control in the agricultural situations and at the various levels described below. It has developed predominantly—perhaps too exclusively—as the study of farm management, that is the application of a knowledge of husbandry practices, of the range of farming systems and of business techniques in a balanced manner to the problem of running a farm business as a whole. Its true scope is, however, wider. It embraces both technical management and economic management, although admittedly it is only the want of a generally acceptable alternative term which has led to the use of the term "management" at some of the levels concerned. The purpose of this appendix is to describe the scope and levels of management in agriculture and to indicate the appropriate educational provision. The sections are arranged as follows:

A. Scope of Management in Agriculture.

B. Levels of Management in Agriculture.

C. Courses.

D. Research and Development.

E. Teacher Training.

A. *Scope of Management in Agriculture*

3. Management in industry generally consists of four main sections:

(*a*) Creating and Controlling Methods of Production ;

(*b*) Financing Production ;

(*c*) Organising the Labour Force ; and

(*d*) Marketing.

4. The nature of agricultural production, and the scale of operation that it imposes, has limited the application of these four functions in agricultural management. The development of technology in agriculture is removing these limitations and opening the way for a fuller application of management principles. The discipline imposed on methods of production in agriculture by the unpredictability of climate and soil demands the maintenance of close interdependence between management and husbandry. This situation is gradually changing as advances in technology enable increasing control to be exercised over natural conditions. The small scale of agricultural business and the frequent concentration of the functions of manager, technician and operator in one man, or at least, a small group of men, has prevented a specialist approach to these functions such as has developed in many of the larger manufacturing industries. These factors have been responsible for the development of management in agriculture as a separate study parallel to management in other fields of business activity, but not identical with it, the foundations having been laid by the university departments of agricultural economics according to the principles of agricultural economics.

5. Political developments have also played a part in limiting the scope of management for the farmer. For example, control of the marketing of products is largely outside the scope of the individual, and prices for the main products are fixed on a national basis. Hence, agricultural marketing has not received much attention as a study. However, in the horticultural and poultry sections of the agricultural industry, fixed prices and assured markets have not applied and marketing has developed in different ways: by means of co-operative action for certain horticultural products and by means of commercial organisations in the case of poultry meat which exercise a strong control over the producer. In the future the other main products are likely to come under increasing competitive pressure.

6. The small scale of the average farm business also accounts for the study of labour relations having received less prominence than in many other industries. Hence, management has concentrated on the two remaining aspects, namely, the problems of production and the problems of capitalising production. The approach to these even, has been limited because technical factors have restricted the size of enterprises, and attitudes to financing production in agriculture have remained somewhat static.

7. The recent great strides in agricultural technology are, however, removing these limitations on production methods and opening access to wider capital resources, including the use of joint stock companies. This has caused a great intensification of the application of management in these spheres and the present management effort is largely concentrated on the selection of enterprises for a particular farm, and problems of capitalising production. This in turn is creating larger businesses which in their turn will create a demand for the other aspects of management to be applied in agriculture. Better understanding of production processes on the one hand, and the application of techniques such as supply prediction and product promotion to marketing, on the other, are creating conditions in which control in agriculture can be effective, and a study of such control, namely, management, becomes a necessity.

8. Two features of management in industry generally have been developed recently: the quantification of management problems which has led to the application of sophisticated mathematical techniques, and a sympathetic approach to human needs and ambitions which is proving of great value in creating good labour relations. It is not difficult to see the need for the former in agriculture, and the second aspect is as appropriate to small businesses as to large and no doubt will continue to develop.

B. *Levels of Management in Agriculture*

9. Management is a thread which runs though the whole productive process and may for convenience be classified under four main headings as follows:

(*a*) operations level;

(*b*) technician level;

(*c*) farm planning level;

(*d*) economics level.

They are interdependent.

(*a*) Management at operations level involves the efficiency of the worker himself and his attitude towards his job, in order that he may constantly seek the best method of carrying out a particular operation. It is extremely important, and efficiency of production largely depends upon it, partly because the worker in agriculture has to cope with a wide range of unpredictable variations, and also because close supervision is very often impracticable and he is largely left to use his own initiative. The teaching of management at this level should be an integral part of craft instruction for workers, and should be included in technician and technology courses as an objective study.

(*b*) Technician level. This involves the choice of method which will be adopted to carry out various production processes, the selection of the best equipment and materials to carry out the method and the sequence of operations. The responsibility for deciding on the actual technique rests with the manager, but the effectiveness with which it is carried out depends largely on the worker so that management study at this level is particularly appropriate to the key worker, for example, the head herdsman, the person in charge of any livestock enterprise, or of arable cultivations. This is sometimes referred to as enterprise management and is concerned very largely with the effect of keeping and using records and with applying the results of techniques such as method study and work measurement.

(*c*) Farm planning. This concerns the operation of the farm as a business. It involves choice of enterprises, the levels of production to be adopted, labour utilisation and the methods of financing and controlling the business. This is the sphere of activity to which at the present time the term management is most commonly applied.

(*d*) Economics level. This embodies the wider aspects of management concerning agriculture in its national and even international context. It requires a deeper knowledge of general and agricultural economics, economic geography, the development of agriculture, the relation between the agricultures of various countries and between agriculture and other industries. In addition it involves a knowledge of marketing problems, the financial structure of industries, the social implications of agricultural production, international trade, etc. It is particularly appropriate to the potential leaders of the farming industry, consultants, and to people who work largely in ancillary industries, such as marketing organisations, government advisory services, and related professional fields. Not least, of course, it will be appropriate to those who will develop agricultural management through the medium of research.

C. *Courses*

10. Aspects of management appropriate to the *operator and technician* should be included in husbandry courses and in the main taught by husbandry teachers. They are important elements in the technology of production and should be included in all part-time and full-time courses up to the level of the National Certificate in Agriculture. The syllabus would include an appreciation of the need for and scope of management and an elementary study of techniques appropriate to enterprise management, including the keeping and use of records and a study of operational efficiency.

11. Courses in *farm planning* may be of three kinds:

(*a*) Supplementary to the National Certificate in Agriculture. In this case it is highly desirable for the student to have a good measure of maturity and experience of production problems. He should have at least two years experience after the certificate course, and this should be under supervision. This is necessary if he is to benefit fully, because farm planning demands the making of decisions and the exercise of judgment, the capacity for which is developed through experience.

(*b*) A full-time course which might be at the level of the proposed Ordinary National Diploma courses, containing a large element of farm planning in addition to husbandry. The difficulty of giving students the necessary experience on which to base judgment would be the limiting factor in such a course. It might be mitigated by using the sandwich principle.

(*c*) Part-time courses for mature farmers and farm managers and intensive advanced courses and conferences. These courses would include the techniques used in enterprise selection, a study of enterprise management in greater depth than in 10 above, and an introduction to farm management in its fuller sense. They would be useful to farmers of small and medium sized farms and to advisers working in the field of farm production. The importance of linking this instruction with that in the technology of production requires emphasis. There is no case for a specialised course in farm planning which has not been preceded by, or is not linked with, a course in husbandry, or long practical experience of farming.

12. The field of *management in its fuller sense* as applied to agriculture, includes the aspects already mentioned and in addition requires a study of agricultural business and economics. A specialised course is justifiable and might be taken at Higher National Diploma or degree level. Students would have to study a wide range of subjects and would need to be suitably qualified academically. Such a course would include a good deal of agricultural economics, social and financial studies, and farm management with emphasis on business studies, and would cover also a knowledge of techniques used in agricultural production and enterprise management. It is possible that the course could be taken as supplementary to an Ordinary National Diploma course but, as a general rule, this seems undesirable, since students would have to acquire a good knowledge of analytical techniques, and undertake a lot of case study. This and the wide range of subjects would require the equivalent of a three year full-time course. As suggested in paragraph 71 of the report this might be organised as a Higher National Diploma course, followed, after an interval, by a post-diploma course. An establishment making this provision would have to develop wide contacts with agricultural, business, economic and governmental organisations, and also international contacts. To be a management specialist the successful student would need further experience to deepen his understanding of the human problems involved. There is likely to be increasing opportunity for him in the large commercial firm, in large farming companies, in teaching and in research.

D. *Research and Development*

13. As has already been suggested there is wide scope for the application of management techniques developed in industry generally to the problems of agriculture, and the development of agricultural technology makes this a real possibility for the first time. Such research is carried on by the agricultural economics departments of various universities. But there is undoubtedly scope for increased effort in this direction at all levels, particularly in a technological context, and such research should inform teaching in the courses suggested at Higher National Diploma level and in any degree courses in this field. Staff who teach at these levels should be engaged in research.

E. *Teacher Training*

14. So far training of teachers of management has been almost entirely on an ad hoc basis in agriculture, and what has been done has been largely initiated by the agricultural economics departments. At present it seems doubtful if the teachers exist to do any more in this field, nor are there any courses

especially designed for their training. It is clearly necessary for any such training to be associated with research and to use techniques such as case study, particularly in the present very active stage of development, and there seems to be a clear case for combining courses at advanced level with research facilities at one or more establishments. In addition to a good grounding in management the teacher will also need training in specialist pedagogic aspects. Here again very little work has been done for agricultural teachers, but the Management Teacher Development course at The Polytechnic, London, is now available for all teachers who are engaged in Management education.

Conclusion

15. As economic pressures increase there will be ever widening scope for the application of management in agriculture. This will require a great increase of effort to give basic instruction, to mount research, and to train teachers and research workers.

EXAMINATIONS IN AGRICULTURAL SUBJECTS

Body	Examining Body		Examination		Course	
	Name	Representative Composition	Qualification	External or Internal	Academic Qualifications for Admission	Duration
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bodies concerned solely with Agricultural Examinations.	1. National Agricultural Examination Board.	Royal Agricultural Society of England ... ... (6) Royal Highland and Agricultural Society of Scotland ... ... (6) Department of Education and Science (Observer).	National Diploma in Agriculture.	External	4–6 " O "	2 years full-time
	2. National Dairy Examination Board.	Royal Agricultural Society of England ... ... (6) Royal Highland and Agricultural Society of Scotland ... ... (6) Royal Association of British Dairy Farmers ... ... (6) Department of Education and Science (Observer)	National Diploma in Dairying.	External	4–6 " O "	2 years full-time
	3. National Certificate in Agriculture Examinations Board.	City and Guilds of London Institute ... ... (2) National Farmers' Union (2) National Union of Agricultural Workers ... (1) Royal Agricultural Society of England ... ... (2) Transport and General Workers' Union ... (1) Association of Agricultural Education Staffs ... (2) County Councils' Association ... ... (4) National Association of Principal Agricultural Education Officers ... (2) Ministry of Agriculture, Fisheries and Food } Assessors Dept. of Education and Science. } Assessors	National Certificate in Agriculture.	Internal	—	1 year full-time
			National Certificate for Women in Agriculture with Home Economics.	Internal	—	1 year full-time

	4. Examination Board in Agricultural Engineering.	Appointed by Institution of Agricultural Engineers and including also representatives of:— Agricultural Engineers' Association Royal Agricultural Society of England Department of Agriculture and Fisheries for Scotland Department of Education and Science Ministry of Agriculture, Fisheries and Food Scottish Education Department and invited teachers	National Diploma in Agricultural Engineering.	Internal ...	... *Engineering Candidates:*— O.N.C. (Engineering); Agricultural Engineering Technician's Certificate Mechanical Engineering Technician's Certificate, Part II *Agricultural Candidates:*— Degree in Agriculture *or* National Diploma in Agriculture	1 year full-time
	5. National Poultry Diploma Board Limited.	British Chicken Association (1) British Egg Association ... (1) British Turkey Federation (1) Poultry Stock Association (2) National Farmers' Union... (4) National Union of Agricultural Workers ... (1) Royal Agricultural Society of England ... ... (1) Five Universities ... (1 each) Three Agricultural Colleges (1 each) Four Institutes ... (1 each) Agricultural Education Association ... ... (1) Poultry Education Association ... ... (1) Ministry of Agriculture, Fisheries and Food (England and Wales) Ministry of Agriculture Northern Ireland Department of Agriculture and Fisheries for Scotland } 1 each) Dept. of Education and Science (assessor) ... (1) British Egg Marketing Board (1) National Institute of Poultry Husbandry ... ... (1) Poultry Club ... ... (1) Co-opted ... ... (8)	National Certificate in Poultry Practice.	External	—	1 year full-time
			National Diploma in Poultry Husbandry.	External	4 "O" (2 specified) ...	2 years full-time
			National Diploma in Poultry Technology.	External	2 "A" in Chemistry and Biology/Zoology and 4 "O" (some specified).	3 years full-time
Bodies with other interests in Agriculture and Horticulture.	6. Royal Horticultural Society.	Examinations Board consists of some Council members plus invited members representing the various industrial and educational interests (or in a personal capacity).	National Diploma in Horticulture (Inter.).	External	4 "O" (some specified) *or* 3 "O" (specified).	2 years full-time (but not a requirement of examination).
			National Diploma in Horticulture (Final).	External	No course	No course.
			National Certificate in Horticulture.	External	—	1 year full-time
			National Certificate in Horticulture (Supplementary).	External	National Certificate in Horticulture.	1 year full-time

Note.—The above qualifications are shown mainly in G.C.E. forms, to indicate the level. They are not exhaustive.

Body	Examining Body		Examination		Course	
	Name	Representative Composition	Qualification	External or Internal	Academic Qualifications for Admission	Duration
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	7. National Association of Groundsmen.	—	3rd Class Certificate ...	External	—	Grade of Certificate awarded determined by level of attainment. Short or part-time
			1st and 2nd Class Certificate.	External	3rd Class Certificate ...	
			National Diploma ...	External	3rd and 1st or 2nd Class Certificate.	
	8. Royal Association of British Dairy Farmers.	—	National Certificate in Dairying.	External	—	1 year full-time (normally taken concurrently with National Certificate in Agriculture).
			National Certificate in Cheesemaking.	External	—	
Bodies with wider interests.	9. Institute of Park and Recreation Administration (Inc.).	Examination Board consists of some Council members plus invited members from various professional and educational interests.	Diploma of Park Administration (Inter.)	External	4 " O " (some specified) ...	Course not a requirement but 1 year course available at College of Park Administration.
			Diploma of Park Administration (Final).	External	Inter	
	10. Royal Institution of Chartered Surveyors.	—	Agriculture and Land Agency First; Inter Examination: Final Examination (Parts I and II).	External, but with exemptions for College examinations.	5 " O " (after 1966 2 "A" and 3 " O "). National Diploma in Agriculture. National Diploma in Dairying. National Diploma in Horticulture.	3 years full-time
	11. Chartered Land Agents' Society.	—	Parts I, II and III Written and Practical.	External, but with limited exemptions for College examinations.	For 1967 Exam.: 5 " O " (2 specified). For 1968 and subsequent: 2 "A" and 3 " O " (2 specified).	3 years full-time
	12. Chartered Auctioneers' and Estate Agents.	—	First: Inter and Final Examinations (Rural).	External, but with exemptions for College examinations.	4–5 " O " (2 specified) ...	2–3 years full-time plus practical experience.
General Examining Bodies.	13. City and Guilds of London Institute.	*Advisory Committee for General Agriculture* Ministry of Agriculture, Fisheries and Food ... (1) Department of Education and Science ... ... (1) National Federation of Young Farmers' Clubs... (1)	General Agriculture (Stage I)	External	—	Not less than 240 hours part-time.
			General Agriculture (Stage II).	External	Normally Stage I	Not less than 440 hours part-time.

13. City and Guilds of London Institute *cont.*	Scottish Education Department	(1)	General Agriculture (Stage III).	External	Normally Stage II and considerable practical experience desirable.	Not less than 100 hours part-time.
	Scottish Association of Young Farmers' Clubs...	(1)				
	National Proficiency Tests Committee for Farm Crafts	(1)				
	National Union of Agricultural Workers ...	(1)				
	Transport and General Workers' Union (Agricultural Branch) ...	(1)				
	Agricultural Apprenticeship Council	(1)				
	National Farmers' Union	(2)				
	County Councils' Association	(1)				
	Association of Agricultural Education Staffs ...	(1)				
	National Association of Principal Agricultural Education Officers ...	(1)				
	Association of Teachers in Technical Institutions ...	(1)				
	Association of Technical Institutions	(1)				
	Association of Principals of Technical Institutions ...	(1)				
	Council of Technical Examining Bodies	(2)				
	East Midlands Educational Union	(1)				
	Yorkshire Council for Further Education ...	(1)				
	Institution of Agricultural Engineers	(1)				
	Royal Agricultural Society of England	(1)				
	British Veterinary Association	(1)				
	Agricultural Education Association	(1)				
	Association of Education Committees	(1)				
	Association of Lecturers in Agricultural Machinery	(1)				
	National Federation of Women's Institutes ...	(1)				
	Additional Advisers ...	(6)				

Note.—The above qualifications are shown mainly in G.C.E. forms, to indicate the level. They are not exhaustive.

Body	Examining Body		Examination		Course	
	Name	Representative Composition	Qualification	External or Internal	Academic Qualifications for Admission	Duration
(1)	(2)	(3)	(4)	(5)	(6)	(7)
General Examining Bodies—*cont.*	13. City and Guilds of London Institute *cont.*	*Advisory Committee for Agricultural Engineering* Institution of Agricultural Engineers ... ... (2) National Farmers' Union... (1) Agricultural Machinery and Tractor Dealers' Association ... ... (3) Scottish Agricultural Machinery Association ... (1) National Federation of Young Farmers' Clubs... (1) Rural Industries Bureau ... (1) National Union of Agricultural Workers ... (1) Transport and General Workers' Union ... (1) National Institute of Agricultural Engineering ... (1) National Master Farriers', Blacksmiths' and Agricultural Engineers' Association ... ... (1) National Association of Principal Agricultural Education Officers ... (1) Association of Agricultural Education Staffs of Local Authorities ... ... (1) County Councils' Association ... ... (1) Association of Technical Institutions ... ... (1) Council of Technical Examining Bodies ... ... (1) Association of Teachers in Technical Institutions ... (1) Association of Lecturers in Agricultural Machinery (1) Association of Principals of Technical Institutions ... (1) Ministry of Agriculture, Fisheries and Food ... (1) Department of Education and Science ... ... (2) Scottish Education Department ... ... (1) Additional Advisers ... (1)	Agricultural Mechanic's Certificate.	External	—	Not less than 720 hours
			Agricultural Engineering Technician's Certificate.	External	Agricultural Mechanic's Certificate.	Not less than 480 hours

13. City and Guilds of London Institute *cont.*	*Advisory Committee for Horticulture* Horticultural Education Association ... ... (3) Royal Horticultural Society (2)	Horticulture (Stage I)	External	—	Not less than 360 hours part-time.
	National Farmers' Union... (1) Horticultural Trades Association ... ... (2)	Horticulture (Stage II)	External	Normally Stage I	Not less than 440 hours part-time.
	County Councils' Association ... ... (1) National Union of Agricultural Workers ... (1) Transport and General Workers' Union ... (1) Agricultural Apprenticeship Council ... ... (2) Institute of Park and Recreation Administration (Inc.) ... ... (1) Agricultural Education Association ... ... (1) Association of Education Committees ... ... (1) National Association of Principal Agricultural Education Officers ... (1) Association of Agricultural Education Staffs ... (1) Association of Technical Institutions ... ... (1) Association of Principals of Technical Institutions ... (1) Association of Teachers in Technical Institutions ... (1) Association of Lecturers in Agricultural Machinery (1) Department of Education and Science ... ... (1) Scottish Education Department ... ... (1) Ministry of Agriculture, Fisheries and Food ... (1) Department of Agriculture and Fisheries for Scotland (1) Women's Farm and Garden Association ... ... (1) National Proficiency Tests Committee for Farm Crafts ... ... (1) Council of Technical Examining Bodies ... ... (2) Additional Advisers ... (4)	Horticulture (Stage III) (from 1966).	External	Normally Stage II and considerable practical experience desirable.	Not less than 240 hours part-time.

Note.—The above qualifications are shown mainly in G.C.E. forms, to indicate the level. They are not exhaustive.

Body	Examining Body		Examination		Course	
	Name	Representative Composition	Qualification	External or Internal	Academic Qualifications for Admission	Duration
(1)	(2)	(3)	(4)	(5)	(6)	(7)
General Examining Bodies—*cont.*	14. Union of Lancashire and Cheshire Institutes.	Association of Technical Institutions. Association of Principals of Technical Institutions. Association of Teachers in Technical Institutions. City and Guilds of London Institute. National Society for Art Education. National Union of Teachers ... University of Liverpool ... University of Manchester ... Manchester College of Science and Technology. Department of Education and Science.	General Agriculture (Stage I). General Course in Horticulture (New scheme). Senior Course in Horticulture.	External ... ... External ... ... External	— — Completion of General Course	Not less than 400 hours part-time. Not less than 400 hours part-time. Not less than 300 hours part-time.
	15. Northern Counties Technical Examinations Council.	*Council* Reps. of all L.E.A.s in Region Durham University. University of Newcastle upon Tyne. N.E. Coast Institution of Engineers and Shipbuilders. North of England Institute of Mining and Mechanical Engineers. City and Guilds of London Institute. Association of Technical Institutions. Association of British Chambers of Commerce. Department of Education and and Science. *Agricultural Board* National Farmers' Union. National Union of Agricultural Workers. University of Newcastle upon Tyne.	General Agriculture (Stage I).	External	—	Not less than 160 hours part-time.

	Chief Education Officers and Members of Education Committees. Principals and Members of Governing Bodies of Farm Institutes. National Federation of Women's Institutes. Chairmen of Agricultural Apprenticeship Committees in Region. Department of Education and Science. Ministry of Agriculture, Fisheries and Food.				
16. Union of Educational Institutions.	L.E.A. Reps. 22 Counties: 21 C.B.s. Association of Technical Institutions. Association of Principals of Technical Institutions. Association of Teachers in Technical Institutions. City and Guilds of London Institute. Department of Education and Science. National Farmers' Union. University of Birmingham. University of N. Staffordshire.	Agriculture	External	—	—
		Horticulture	External	—	Not less than 220 hours part-time.
17. Local Government Examinations.	Apprenticeship Committee ...	Uncertificated Gardener Proficiency Tests.	External	—	No course prescribed.
	Local Government Examinations Board. Institute of Park and Recreation Administration (Inc.) Royal Horticultural Society. Employers' side of National Council. T.U. side of National Council.	Certificated Gardener Examination.		—	No course prescribed.

Note.—The above qualifications are shown mainly in G.C.E. forms, to indicate the level. They are not exhaustive.

Appendix D

STATISTICS

The tables relate to students at the five agricultural colleges and 36 county agricultural and horticultural institutes shown in Department of Education and Science List 185, " Full-time Agricultural Education in England and Wales ".

Tables in the Text

Table 1 (paragraph 9)	Persons engaged in agriculture.
Table 2 (paragraph 11)	Distribution of holdings and regular whole-time male workers aged 20–64, by labour size groups.
Table 3 (paragraph 33)	Recruitment and Education.
Table 4 (paragraph 58)	General pattern of further education courses for school leavers.
Table 5 (paragraph 60)	General Certificate of Education qualifications of students in full-time agricultural courses.
Table 6 (paragraph 79)	Enrolments in diploma and supplementary courses, other than those in general agriculture.
Table 7 (paragraph 146)	Women diploma holders in ancillary occupations.
Table 8 (paragraph 150)	Women students in diploma courses.

Tables in the Appendix

Table A	Number of full-time and sandwich students at agricultural colleges and institutes, by type and subject of course and by age groups.
Table B	Number of full-time and sandwich students at establishments offering diploma courses.
Table C	Number of full-time and sandwich students in supplementary courses at county institutes.
Table D	Number of full-time and sandwich students in diploma and supplementary courses, by academic qualifications on entry.
Table E	Practical experience of students entering diploma and supplementary courses.
Table F	Results and occupations of students completing diploma and supplementary courses in general agriculture.
Table G	Results and occupations of students completing diploma courses in dairying.
Table H	Results and occupations of students completing diploma and supplementary courses in horticulture.
Table I	Results and occupations of students completing diploma courses in poultry husbandry.
Table J	Diploma holders in ancillary occupations.

TABLE A

NUMBER OF FULL-TIME AND SANDWICH STUDENTS AT AGRICULTURAL COLLEGES AND INSTITUTES, BY TYPE AND SUBJECT OF COURSE AND BY AGE GROUPS, NOVEMBER 1964

Age	Post-Diploma	2 year Diploma Courses				Other Diploma		Supple-mentary	Sand-wich	1 year Certificate Courses			Others	Total
		Agri-culture	Dairying	Horti-culture	Poultry Hus-bandry	Poultry Tech-nology	Estate Manage-ment			Agri-culture	Horti-culture	Poultry		
17 and under ...	0	2	7	2	0	0	1	1	1	464	31	16	114	639
18–20	7	537	134	67	42	14	115	73	16	990	161	30	182	2,368
21–24	28	295	18	32	9	8	76	73	12	97	38	5	45	736
25 and over ...	5	36	7	3	16	6	13	21	7	34	7	10	22	187
All ages ...	40	870	166	104*	67	28	205	168	36	1,585	237	61	363	3,930
	40	1,440						204		1,883			363	3,930

---

* Includes 14 students on a supplementary course at Pershore Institute of Horticulture who were preparing to take the National Diploma in Horticulture (Intermediate) examination.

Source: Annual Returns from Establishments to the Department.

TABLE B

NUMBER OF FULL-TIME AND SANDWICH STUDENTS AT ESTABLISHMENTS OFFERING DIPLOMA COURSES, NOVEMBER 1964

Establishment	Post-Diploma	2 year Diploma Courses				Other Diplomas		Supplementary	Sandwich	1 year Certificate Courses			Others	Total
		Agriculture	Dairying	Horticulture	Poultry Husbandry	Poultry Technology	Estate Management			Agriculture	Horticulture	Poultry		
Essex	12	91	—	54	—	—	—	—	—	45	18	—	—	220
Harper-Adams	—	189	—	—	67	28	—	—	—	—	—	—	—	284
Lancashire ...	—	47	41	—	—	—	—	—	—	39	24	13	—	164
Monmouthshire	—	—	19	—	—	—	—	—	—	26	—	16	14	75
Royal	6	226	—	—	—	—	205	—	—	—	—	—	110	547
Seale Hayne ...	22	176	57	—	—	—	—	—	—	—	—	—	—	255
Shuttleworth ...	—	141	—	—	—	—	—	—	—	—	—	—	14	155
Studley ...	—	—	49	36	—	—	—	—	—	—	—	—	20	105
Pershore ...	—	—	—	14	—	—	—	7	11	—	43	—	13	88
Total	40	870	166	104	67	28	205	7	11	110	85	29	171	1,893

Source: Annual Returns from Establishments to the Department.

TABLE C

NUMBER OF FULL-TIME AND SANDWICH STUDENTS IN SUPPLEMENTARY COURSES AT COUNTY INSTITUTES NOVEMBER 1964

	Subject of Course	*Number of Students*
Agriculture (Husbandry)		
Berkshire	Farm and Grassland Management	8
Dorset	Animal Husbandry	5
Durham	Advanced Husbandry	19
Lincs. (Lindsey)	Arable Farm Management	8
Northants	Livestock Production and Farm Business Management	5
Wiltshire	Farm Mechanisation, City and Guilds 261	11
Yorks. (West Riding)	Animal Husbandry	6
	Farm Machinery	4
	Total	66
Farm Organisation and Management		
Durham	Farm Organisation and Business Management	8
Leicestershire	Farm Organisation and Management	18
Shropshire	Farm Business Management and Advanced Husbandry	10
Yorks. (East Riding)	Farm Organisation, Management and Mechanisation	13
Yorks. (West Riding)	Farm Organisation and Management	6
	Total	55
Horticulture		
Hertfordshire	Glasshouse Production	11
Kent	Crop Production under Glass	6
	Plant Nursery Practice and Management	6
	Commercial Fruit Growing	9
*Worcestershire	Market Gardening	7
Yorks. (West Riding)	Recreational and Decorative Horticulture	8
	Total	47
	GRAND TOTAL	168

* 14 Students at Pershore Institute of Horticulture on a course leading to N.D.H. (Inter.) are shown in Table B.

Source: Annual Returns from Establishments to the Department.

TABLE D

NUMBER OF FULL-TIME AND SANDWICH STUDENTS IN DIPLOMA AND SUPPLEMENTARY COURSES BY ACADEMIC QUALIFICATIONS ON ENTRY 1963/4

O Level = pass at the Ordinary level in the examination for the General Certificate of Education, including students with one or more passes at the Advanced level.

A Level = pass at the Advanced level in the examination for the General Certificate of Education

Academic Qualifications	Diploma Courses					Supplementary		Total
	Agriculture	Dairying	Estate Management	Horticulture	Poultry	Agriculture	Horticulture	
All Students	831	141	169	102	77	94	66	1,480
1–3 O level passes	23	2	1	4	—	26	13	69
4 O level passes	40	5	5	1	9	12	7	79
5 O level passes	175	15	64	16	20	6	10	306
6 or more O level passes	572	118	99	81	45	16	15	946
1 A level pass	79	15	27	19	4	—	1	145
2 A level passes	40	20	17	15	4	—	—	96
3 or more A level passes	28	1	5	8	2	—	1	45
City and Guilds and Regional Examining Union passes	—	—	—	—	—	26	51	77
N.C.A., N.C.H., N.C.P.	66	7	3	16	5	59	66	222
Other	25	—	—	8	4	7	4	48

Source: Returns made by teaching establishments to Advisory Committee. A student with more than one type of qualification is counted in each section.

N.C.A., N.C.H., N.C.P. = National Certificates in Agriculture, Horticulture and Poultry Practice.

TABLE E

PRACTICAL EXPERIENCE OF STUDENTS ENTERING DIPLOMA AND SUPPLEMENTARY COURSES, 1963/4

Practical experience in the United Kingdom	Diploma Courses					Supplementary*		Total
	Agriculture	Dairying	Estate Management	Horticulture	Poultry	Agriculture	Horticulture	
18 or more months	680	28	—	29	19	42	6	804
12–18 months	127	98	—	48	46	5	9	333
6–12 months	14	13	169	8	2	2	5	213
Less than 6 months	4	—	—	10	1	38	—	53
None	6(1)	2(2)	—	7	9(3)	7(4)	46	77
Total	831	141	169	102	77	94	66	1,480

(1) Includes 1 student with practical experience outside U.K.

(2) Includes 2 students with practical experience outside U.K.

(3) Includes 1 student with practical experience outside U.K. and 2 whose practical experience is unknown.

(4) Includes 2 students with practical experience outside U.K.

* Experience since completing certificate course.

Source: Returns made by teaching establishments to Advisory Committee.

TABLE F

RESULTS AND OCCUPATIONS OF STUDENTS COMPLETING DIPLOMA AND SUPPLEMENTARY COURSES IN GENERAL AGRICULTURE

A. Results:

	1963	*1964*
National Diploma in Agriculture	268 (72%)	212 (53%)
College diploma only	77 (20%)	148 (37%)
No qualification	29 (8%)	37 (9%)
Total completing course	374	397

B. Occupations entered by students completing courses

	1963				1964	Average annual recruitment(2)	Forecast of future needs(2)
	Diploma(1)			Supplementary	Diploma Total(1)		
	Men	Women	Total				
Practical farming:							
Own farm	54	—	54	—	65		
Farm management	22	1	23	26	20		
Farm worker	48	—	48	—	37		
Estate management	1	—	1	—	2		
Manufacturers and suppliers	17	—	17	11	29	40	more
Processing and distribution	8	—	8	3	3	15	same or more
Advisory services	13	1	14	1	9	20	same or more
Research	4	—	4	3	6	2	—
Teaching	4	—	4	—	10	18(3)	same or more
Further education and training	55	—	55	8	9		
Secretarial	2	—	2	—	—		
Other	1	—	1	2	7		
Not known	40	—	40	—	46		
Totals	269	2	271	54	243		

(1) Students of the Royal Agricultural College are not included. 154 completed courses at this college.

(2) Source: approximate figures derived from evidence submitted by employers.

(3) Estimated.

Source: Returns made by teaching establishments to Advisory Committee.

TABLE G

RESULTS AND OCCUPATIONS OF STUDENTS COMPLETING DIPLOMA COURSES IN DAIRYING

A. Results:

	1963	*1964*
National Diploma in Dairying	19 (37%)	43 (65%)
College diploma only...	18 (35%)	12 (18%)
No qualifications	14 (28%)	11 (17%)
Total completing course	51	66

B. Occupations taken by students completing courses

	1963			1964	Annual intake (approx.) (1)	Forecast of future needs(1)
	Diploma			Diploma Total		
	Men	Women	Total			
Practical farming ...	3	8	11	10		
Horticulture ...	—	—	—	1		
Estate management	—	—	—	1		
Manufacturers and suppliers	2	1	3	—	10	same or more
Processing and distribution	1	2	3	14	15	more
Advisory services ...	—	2	2	11	14(2)	same or more
Research	1	3	4	7	4(3)	same
Teaching	—	3	3	4	8(4)	same or more
Further education and training ...	1	5	6	8		
Secretarial	—	2	2	—		
Other	—	7	7	8		
Not known... ...	—	10	10	2		
Totals ...	8	43	51	66		

(1) Source: evidence received from employers.

(2) Recruitment to the Milk Marketing Board and the Ministry of Agriculture, Fisheries and Food.

(3) Recruitment to the Agricultural Research Council.

(4) Estimated.

Source: Returns made by teaching establishments to Advisory Committee.

TABLE H

RESULTS AND OCCUPATIONS OF STUDENTS COMPLETING DIPLOMA AND SUPPLEMENTARY COURSES IN HORTICULTURE

A. Results:

	1963	*1964*
National Diploma in Horticulture (Inter.) ...	13 (23%)	15 (26%)
College Diploma excluding those with NDH (Inter.)	41 (72%)	40 (70%)
No qualification	3 (5%)	2 (4%)
Total completing course	57	57
National Certificate in Horticulture (Supplementary)	24	
College award only	15	
No qualification	1	
	40	

B. Occupations taken by students completing courses

	1963				1964	Average annual recruitment(1)	Forecast of future needs(1)
	Diploma			Supplementary	Diploma Total		
	Men	Women	Total				
Practical farming ...	—	—	—	11			
Horticulture:							
Commercial	22	10	32	20	30		
Parks and gardens ...	2	4	6	1	8		
Manufacturers and suppliers	1	—	1	—	—	5	same or more
Processing and distribution	—	—	—	3	—		
Advisory services ...	1	–	1	—	6	6	
Research	1	3	4	1	5	4	same
Teaching	4	2	6	—	2	6(2)	same or more
Further education and training	—	4	4	2	4		
Other	–	1	1	1	—		
Not known	–	2	2	1	2		
Totals	31	26	57	40	57		

(1) Source: approximate figures derived from evidence submitted by employers.
(2) Estimated.

Source: Returns made by teaching establishments to Advisory Committee.

TABLE I

RESULTS AND OCCUPATIONS OF STUDENTS COMPLETING DIPLOMA COURSES IN POULTRY HUSBANDRY(1)

A. Results:

	1963	*1964*
National Diploma in Poultry Husbandry	26 (67%)	24 (68%)
College diploma only...	7 (18%)	10 (29%)
No qualification	6 (15%)	1 (3%)
Total completing course	39	35

B. Occupations taken by students leaving course

	1963			1964	Average annual recruitment(2)	Forecast of future needs(2)
	Diploma			Diploma Total		
	Men	Women	Total			
Practical farming ...	11	4	15	11		
Manufacturers and suppliers	5	—	5	2	30–50	same or more
Advisory services ...	7	5	12	14		
Research	—	4	4	—		
Teaching	1	—	1	—	2(3)	same or more
Further education and training ...	—	—	—	2		
Other	1	—	1	3		
Not known ...	1	—	1	3		
Totals ...	26	13	39	35		

(1) The first students completed the new three-year course in Poultry Technology in 1965.

(2) Source: Approximate figures derived from evidence submitted by employers.

(3) Estimated.

Source: Returns made by teaching establishments to Advisory Committee.

TABLE J

DIPLOMA HOLDERS IN ANCILLARY OCCUPATIONS

Diploma holders employed in ancillary industries, advisory services, research and teaching

	(rounded totals)
(1) Diploma holders employed in ancillary occupations in 1964	2,400
Diploma holders recruited in the 5-year period 1959–1964	950
Average annual recruitment	190
Forecast of future needs	same or more

	1963	*1964*
(2) Students known to have entered ancillary occupations upon completion of course:		
Men	75	—
Women	21	—
	96 (3)	121(4)

---

(1) Source: evidence received from employers.

(2) Source: evidence received from teaching establishments.

(3) Excluding students from the Royal Agricultural College, which has 30 per cent of all students, or 17 per cent after excluding those attending courses in estate management.

(4) This total represents about 20 per cent of the output of diploma holders. Additionally, about half of this number proceeded to further education and training, which is desirable, and sometimes necessary, for entry to some of the above ancillary occupations.

(83893) Dd. 126258 K40 5/66 St.S.

UNIVERSITY LIBRARY CUP 20 JUL 1966 CAMBRIDGE

DEPARTMENT OF EDUCATION AND SCIENCE

National Advisory Council on Education for Industry and Commerce

REPORT OF THE ADVISORY COMMITTEE ON AGRICULTURAL EDUCATION

Adopted by the National Advisory Council on 3rd February, 1966

LONDON
HER MAJESTY'S STATIONERY OFFICE
1966

Members of the Advisory Committee on Agricultural Education

Sir Harry Pilkington (*Chairman*), Chairman, National Advisory Council on Education for Industry and Commerce

Sir William Alexander, L.H.D., Ph.D., Ed.B., M.A., B.Sc., Secretary, Association of Education Committees

Maj. P. D. Birchall, D.L., M.A., Chairman, Governors of Royal Agricultural College

Lord Collison, General Secretary, National Union of Agricultural Workers

Mr. C. V. T. Dadd, M.A., Dip.Agr.(Cantab), Secretary and Technical Director, Royal Agricultural Society of England

Col. F. Lane Fox, Member, West Riding County Council and Agricultural Advisory Committee of Yorkshire Council for Further Education (from September, 1965)

Mr. J. A. C. Gibb, M.A., M.Sc., Senior Lecturer in Agricultural Engineering, University of Reading

Mr. J. S. Hall, B.Sc., J.P., Principal, Cumberland and Westmorland Counties' Farm School, Newton Rigg

Professor J. P. Hudson, M.B.E., G.M., M.Sc., Ph.D., N.D.H., Professor of Horticulture, University of Nottingham

Professor Sir Joseph Hutchinson, F.R.S., Sc.D., Drapers Professor of Agriculture, University of Cambridge

The late Alderman B. G. Lampard-Vachell, C.B.E., M.A., LL.D., A.F.R.Ae.S., Chairman, Education Committee, Devon County Council (until April, 1965)

Maj.-Gen. C. Lloyd, C.B., C.B.E., T.D., B.Sc., F.Inst.P., Director General, City and Guilds of London Institute

Mr. R. F. Martyr, B.Sc.(Hort.), Principal, Pershore Institute of Horticulture, Worcestershire

Dr. H. Ian Moore, C.B.E., M.Sc., Ph.D., N.D.A., Dip.Agr.Sci.(Cantab.), Principal, Seale Hayne Agricultural College

Mr. B. D. Neame, Chairman of the Agricultural Apprenticeship Council, Member of the Development and Education Committee, National Farmers' Union

Mr. E. M. Owens, J.P., Member and Past Chairman, Development and Education Committee, National Farmers' Union

Mr. F. A. W. Peregrine, N.D.A., Vice-Principal, Lancashire County Institute of Agriculture, Winmarleigh

Alderman Mrs. D. M. Rees, C.B.E., J.P., Vice-Chairman of Glamorganshire County Council, and of Glamorganshire Education Committee (until November, 1964)

Mr. J. E. Tabor, O.B.E., M.A., Governor and Past Chairman, Essex Institute of Agriculture, Writtle

Mr. L. M. Tate, B.Sc., M.B.I.M., Principal, Exeter Technical College, Exeter

Councillor Mrs. E. G. Howell Williams, J.P., Member, Anglesey Education Committee (from March, 1965)

Mr. Martin Wilson, C.B.E., M.A., Secretary for Education, Salop County Council (to June, 1965)

Members of the Sub-Committee

Mr. C. V. T. Dadd, M.A., Dip.Agr.(Cantab.)
Mr. J. S. Hall, B.Sc., J.P.
The late Alderman B. G. Lampard-Vachell, C.B.E., M.A., LL.D., A.F.R.Ae.S., J.P. (Chairman until April, 1965)
Mr. R. F. Martyr, B.Sc.(Hort.)
Dr. H. Ian Moore, C.B.E., M.Sc., Ph.D., N.D.A., Dip.Agr.Sc.(Cantab.)
Mr. E. M. Owens, J.P.
Mr. J. E. Tabor, O.B.E., M.A.
Mr. Martin Wilson, C.B.E., M.A. (Chairman from April, 1965)

Assessors	
Mr. J. A. R. Pimlott, C.B.	Department of Education and Science
Mr. D. A. Routh (until December, 1964)	
Mr. M. L. Herzig (from December, 1964)	
Dr. T. I. Davies, H.M.I.	
Mr. J. C. G. Mellars, H.M.I.	
Mr. W. Emrys Jones	Ministry of Agriculture, Fisheries and Food
Mr. A. B. Bartlett	

Secretary	
Mr. R. J. Baker, O.B.E.	Department of Education and Science

The estimated cost of the preparation of this Report is £2020 16*s.* 2*d.* of which £827 1*s.* 0*d.* represents the estimated cost of printing and publishing the Report.

CONTENTS

		Paragraph	Page
	SUMMARY AND MAIN RECOMMENDATIONS		3
	INTRODUCTION	1	8
CHAPTER 1	THE OCCUPATIONS SERVED		
	Agricultural Production	7	9
	Dispersion	8	9
	Structure	9	9
	Trends	15	12
	Ancillary Occupations	20	13
	Conclusions	27	15
CHAPTER 2	NUMERICAL DEMAND		
	Agricultural Production	29	17
	Ancillary Occupations	37	19
	Overseas Demand	40	19
	Conclusion	42	20
CHAPTER 3	EDUCATION AND TRAINING		
	Principles	43	21
	A Requirement of Education	44	21
	A Problem of the Industry	47	22
	Methods of Combining Education and Training ...	49	23
	Sandwich Courses	50	23
	Some Problems of Organisation	55	25
CHAPTER 4	COURSE ORGANISATION		
	Principles	56	27
	Suitability	57	27
	Opportunity	58	27
	Progression	65	30
	Proposals	66	30
	Ordinary National Diploma type Courses ...	67	30
	Higher National Diploma type Courses	68	31
	Technological Degree Courses	69	31
	Post-Diploma Courses	71	33
	Supplementary Courses	72	34
	Part-time Courses	73	34
	Part-time and Block Release Courses	75	35
	Short Courses	76	35
	The Maintenance of Older Students	77	35
	Experimental Work	78	35
CHAPTER 5	SPECIAL BRANCHES AND ALLIED TECHNOLOGIES		
	Agricultural Engineering	79	36
	Occupations	80	36
	Education	85	37
	Dairying		
	Occupations	89	38
	Dairy Farming	90	38
	Advisory Services	91	39
	Milk Processing and Distribution	93	39

CHAPTER 5—*cont.* *Paragraph* *Page*

Education ... 96 40
Dairy Farming ... 97 40
Advisory Services ... 98 40
Milk Technology... ... 99 40
Estate Management (Rural)
Occupations ... 103 42
Education ... 106 42
Horticulture ... 110 43
Occupations
Commercial Horticulture ... 112 43
Amenity Horticulture ... 115 44
The Maintenance of Playing Surfaces ... 116 45
Advisory Services ... 117 45
Posts taken by Students ... 118 45
Craft and Technology ... 119 45
Education
The Current Situation ... 121 46
Proposals ... 124 47
Poultry Husbandry
Occupations ... 129 48
Education
Current Provision ... 134 49
Sandwich Courses ... 136 50
Short Courses ... 140 51
Part-time Courses ... 141 51

CHAPTER 6 WOMEN

Occupations
Production ... 142 52
Ancillary Occupations ... 146 52
Education ... 150 53
Secretarial Courses ... 152 53
Range of Courses open to Women ... 153 54
Institutional Provision ... 154 54

CHAPTER 7 EXAMINATIONS

Principles ... 155 55
Current Examination Arrangements and the Need for Rationalisation ... 163 57
Proposals ... 170 59
A new Examination Structure ... 171 59
Internal Examinations, externally assessed ... 172 60
A Central Body ... 173 60
Award-giving Boards ... 182 62

CHAPTER 8 THE INSTITUTIONAL PATTERN

The Present Scene ... 188 64
Future Developments ... 194 65
The Suitability of the Farm or Holding ... 196 66
Economy in the Use of Resources ... 197 66
Demand ... 198 66
Approval of Courses ... 199 66
Advice to Students ... 203 67
Relations with Industry ... 204 68

Page

GLOSSARY ... 69

CHART: Proposed Pattern of Full-time courses in Agriculture outside Universities ... 72

APPENDIX A Organisations and Individuals who have given Evidence ... 73

APPENDIX B Management Education in Agriculture ... 77

APPENDIX C Examinations in Agricultural Subjects ... 82

APPENDIX D Statistics ... 90